IN THIS ISSUE: Advance Papers, Pacific Coast Section, N. E. L. A.

JOURNAL OF ELECTRICITY

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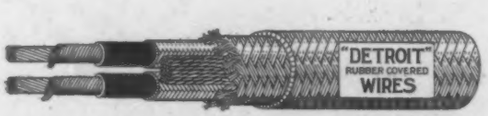

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ROBERT SIBLEY, Editor

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Contents

EDITORIALS 147

Strength—Let a Western Man Be Named—The Convenience Outlet Program—Street Illumination in the West—Barring Foreign Engineers From Practice—Let It Not Be Done by Halves—Putting the Wattage on the Nameplate—California Campaign Studied Nationally—Recognition of the Western Engineer—Dressing Up for Company—Lighting.

NEW INTENSIVE STREET LIGHTING — by W. D'A. Ryan 151

An illustrated account of the new illumination system which makes Broadway, Los Angeles, one of the best illuminated streets in the country.

THE VALUE OF PROPER ILLUMINATION — by F. D. Fagan, R. E. Fisher and Hugh W. Kimball 152

A complete discussion of the place of illumination in increasing beauty and efficiency wherever and whenever artificial light is used.

CO-OPERATING WITH ARCHITECT AND BUILDER — by Garnett Young 157

The baseboard receptacle as the indispensable requirement in the modern home, and the kind of cooperation needed to secure adequate wiring.

THE PERMANENCY OF ELECTRIC PUMPING — by Charles H. Lee 161

The contribution of electricity to irrigation in California, and the factors to be considered by a power company in taking on an electric pumping load.

STORAGE BATTERY LOCOMOTIVES IN HETCH HETCHY TUNNELS — by Paul J. Ost 164

An interesting part of the equipment being used in the construction of the great water and power project in Hetch Hetchy.

CONSTRUCTION ADVANCES ON THE KERCKHOFF PROJECT 170

A page of pictures showing some of the construction high lights on a large Western power project.

THE ART OF CONCILIATION — by S. M. Kennedy 171

A presentation of an important aspect of public utility practice, and its influence upon the securing of the public confidence.

CHANGING FROM COAL TO OIL — by Robert Sibley and Chas. H. Delany 175

A technical discussion of factors which enter into steam power plant practice in changing the fuel from coal to oil.

The Most Artistically Illuminated Cities in the World 146
Frontispiece
An Enterprising Retail Store 156
A Remodeled Store Front 160
Water Wheels for Braking and Initial Power — by Chas. H. Tallant 163
Storage Battery Locomotives in Hetch Hetchy Tunnels —by Paul J. Ost 164
Western Ideas 166
Electrical Cooperative Advertising Campaign 167
Office Records—Their Filing and Indexing — by Irene Warren 168
Essentials of Esperanto — by W. R. Daingerfield 174
Mass in Terms of Velocity of Electrons — by Dr. A. C. Crehore 178
Electrical Aids to Industry 178
An Industrial Division in the Public Library — by Arthur R. Blessing 179
Electrical Service in a Southwestern District 180
Sparks 184
Personals 182
Meeting Notices for Electrical Men 184
Happenings in the Industry 187
Latest in Everything Electrical 190
Books and Bulletins 191
New Electrical Developments 192
Vacuum Cleaner 194

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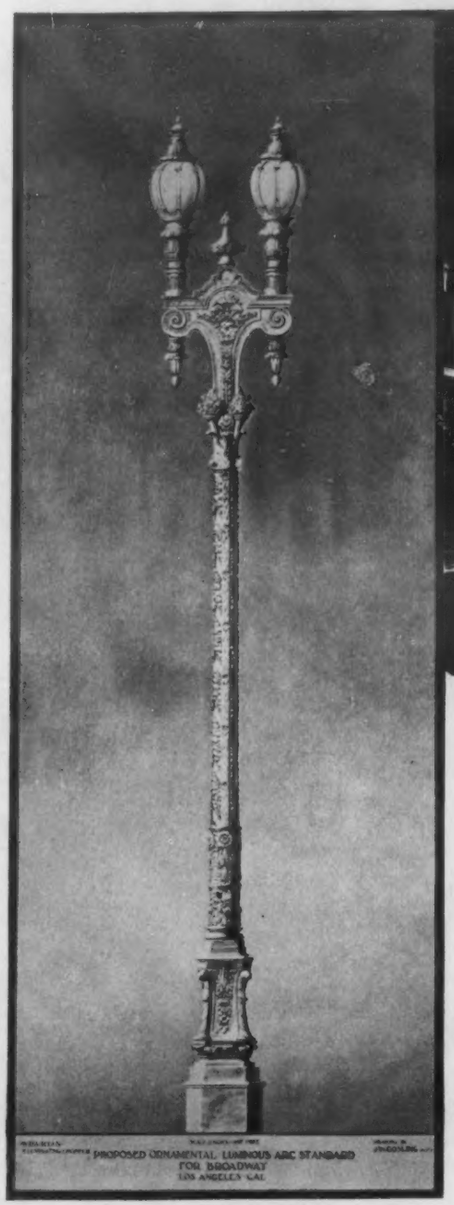
Index to Advertisers—page 28 Where to Buy in the West—pages 29-33



"The Best and Most Artistically Illuminated Cities in the World"

is the latest record electrical to fall to the enterprising district west of the Rocky Mountains. The last month has witnessed the official completion in the Broadway business district of Los Angeles of an illumination system which marks for the great metropolis of the Southwest a civic achievement similar to the Path of Gold and the Triangle Lighting district in San Francisco and the beautiful downtown district in Salt Lake City. Three cities of the West thus stand in a class not even approached in quality of illumination or beauty of design anywhere else in the nation.

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JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 44 SAN FRANCISCO, FEBRUARY 15, 1920 Number 4

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STRENGTH

In these busy days befraught with sickness and stress of every nature, can we not indeed prove what the world so sorely needs to know at this time: that there is strength to be acquired from the giving of our strength, that energy or action directed along right lines does not impoverish nor enfeeble, nor does the hoarding of vitality enrich. As engineers and as men of a great industry that means so much for the easing of human burdens, let us cheerfully give of our best in effort and thereby reap for ourselves a harvest of good activities that give to future action the only drive there is—the full stroke of a sincerity of action that is all-powerful. Such dynamic action is indeed the strength of which we are all in search.

Let a Western Man Be Named

The news that Franklin K. Lane has resigned as Secretary of the Interior, and that his resignation will be accepted by President Wilson, brings to the fore the importance of this governmental post, in which the West is more interested than perhaps in any other. The head of the Interior Department has an important influence over hydroelectric and other power development; in fact, this may be considered the greatest among all his great prerogatives. So vital did Mr. Lane consider this branch of his activities, that in submitting his recent annual report he prefaced it with the remark that it would "primarily deal with coal, electricity and petroleum as the three sources of light, heat and power, and the need for adoption of certain constructive policies affecting their production and distribution." Following this, he enters into a comprehensive survey of the power resources of the nation, making far-reaching recommendations as to their future use.

Among the many administrative fields which come under the Department of the Interior are the Reclamation Service, the Geological Survey, Bureau of Mines, National Park Service, General Land Office and the Indian Office, besides supervision over the territories of Alaska and Hawaii. It needs no argument to show how much more directly the West is concerned with all of these than is the East.

Mr. Lane, who has filled this high office so long with distinction, is a Western man. His successor likewise should be a Westerner—a young man, with the energy and vision to promote most powerfully the immediate progress of the territory beyond the Rockies. For his decision and determination especially will be the problems of hydroelectric development, essential to the further expansion of industry. The West wants the right man in this place—one with true understanding of the existent conditions, one who knows well how to meet them.

The Convenience Outlet Program

The United States Bureau of Housing has estimated that the next three years must see the building of at least five million homes in the United States in order to take care of the present congested situation in the home building operations of America.

Due to the domestic help problem, it is inconceivable to forecast any other statement but that the home of the future must be electrically equipped and wired in a manner surpassing present-day standards in every particular. Even a casual survey of the better residence districts of our modern cities emphatically shows that the installation of the baseboard receptacle, or what is otherwise known as the convenience outlet, is woefully lacking, and in the West, where the uses of electricity now prevail to a per capita extent of three times that elsewhere prevailing in the nation, such a situation is unforgivable. As a consequence, the paper on this timely subject which appears elsewhere in this issue, by Garnett Young of the Commercial Section of the Pacific Coast Section, N. E. L. A., comes with unusual emphasis. It behooves electrical men everywhere to do what they can to prevail upon home-

OUT OF REACH, out of use —
AN OUTLET FOR EVERY APPLIANCE

builders and upon architects that the utmost consideration be given to this important problem.

See what this program means to the electrical industry. The question of the outlet alone in possible revenue mounts up into fabulous sums. At an average cost of two dollars, with ten outlets to the home, it would amount to $100,000,000 in investment. To the power company the increased uses of electricity mount up into untold sums of money. It is estimated that such a program means at least 15,000,000 devices for home use. These bring in on the average an income of twenty-five cents per month, or three dollars per year; hence an annual net income of $45,000,000 is possible for central stations throughout the United States from this crying need of the hour. The problem is a big one and deserves the earnest consideration of all.

Let It Not Be Done by Halves

The critical situation in which the West finds itself this year in regard to shortage of power, leads thoughtful men to view with considerable concern the danger of short cuts and half-measures in handling questions of power development that may in future hinder or limit the ultimate harmonious and economic development of the water power resources of the West. In this connection it is to be hoped that such great developments as the Pit River project of the Pacific Gas & Electric Company will not be stunted in possibilities of complete development, but whatever is done in this wonderful power development program should be accomplished with the view of an extended plan that will ultimately use every available horsepower to its highest economic value.

Other instances of the West are also to be noted, and since the future destiny of this section of the country, both agriculturally and industrially, depend largely upon the economic development of water power, it is to be hoped that the broadest vision will prevail in these particular instances.

Barring Foreign Engineers From Practice

The question of licensing engineers will again come up for consideration this year. Several Western states have already adopted such laws and the matter will be taken up before the legislatures of the others at their next session, either this year or next.

Engineers generally would perhaps be just as satisfied if there were no such laws in existence, but there seems to be general feeling on the part of the public that licenses should be demanded for engineering work as much as for doctors or public accountants, and if such laws are to be passed, they should certainly be such as are framed by the engineering profession itself. The suggested law providing for uniform regulations in all states which has been prepared by the Engineering Council is therefore a step of very general interest. A lack of uniformity between states would be extremely unfortunate, and this action is one which should be welcomed by local committees handling this subject.

On the whole the suggested law is admirable and may well serve as a basis for local ordinances. In the zeal of protecting Americanism, however, one very surprising omission has crept in. No provision is made for the foreign engineer who may be called in on special work. The law calls for a state license for any engineer carrying on more than fifteen days of work in one state during the year—and specifically states that no license may be issued except to one who has at least taken out first citizenship papers. The absurdity of the regulation is at once apparent when we reverse the situation and suppose, for instance, that an American engineer be barred from practice in Australia or India unless he become a British subject.

With the extremely loose thinking going on at the present time in this country, it is possible, of course, that this provision is not an oversight, but we prefer to give the compilers of the proposed law credit for broader patriotism. In any case, it is a matter which should be remedied and an amendment which should be called to the attention of any local committee framing an ordinance for actual adoption.

Street Illumination in the West

Street-illumination at once effective and artistic is the aim of every modern municipality of advanced ideals. Several cities of the West have taken the lead in the movement for better lighting, and the achievements of San Francisco, Los Angeles and Salt Lake City in this direction are particularly notable. "The Path of Gold" illumination of San Francisco's Market Street deserves to take place with the very best street-lighting systems of the world, and it is satisfying to know that through the activity of the Down Town Association its continuance in full brilliancy is assured for three years more. Los Angeles now has a "Radiant Way" in its Broadway, as described in the leading article of this issue of the Journal of Electricity, and the "White Way" lighting system of Salt Lake City is already famous.

The general consensus of opinion is that the modern illumination arrangements on the main thoroughfares of these cities combine utility and beauty in a truly admirable manner. Some criticism there has been indeed, but not of a persistent nor widespread currency. The objection has been ventured in Los Angeles, for instance, that the clusters of lights are too high above the street, but on the whole the public appears well satisfied with the effect.

Merchants of the main retail districts find their places of business much improved by the installation of these new lighting developments, and those that have contributed to the upkeep of the systems feel that the outlay has been wisely expended. Other municipalities in the United States which aspire toward the "city beautiful" ideal are pointing to the illumination features of San Franciso, Los Angeles and Salt Lake City as models to be followed in future city-planning.

Putting the Wattage on the Nameplate

One Western power company had some trouble about a year ago with a number of small heaters which were sold through department stores and other non-electrical sources, due to the fact that the owners of these heaters had been given a false idea of their cost of operation at the time they purchased them. They started out with the understanding that the heaters would cost but 1c per hour to operate and blamed the power company for the size of the bill which was furnished them at the end of the month. Through the educational process of having to pay their bills, this difficulty has now been done away with, but it suggests a simple remedy which might have forestalled the trouble in the first place.

Electric appliances are now plainly marked in volts and amperes, which information is undoubtedly useful in selecting fuses for the circuit on which the heater is to operate, but is unintelligible to the householder in predicting the amount his bill is to be. He pays for service in watts and kilowatts, and only in exceptional cases is he able to translate the one set of figures into the other. It would be a simple matter for the manufacturer to add the necessary wattage to the information on the nameplate and thus avoid confusion in the mind of the purchaser and even in that of the non-electrical dealer, through which channel so many of these simpler types of appliances are at present sold.

California Campaign Studied Nationally

It is quite gratifying for men of the electrical industry in the West to know that the California Electrical Co-operative Campaign has gone, with its ideals, to the East. A recent gathering of men of national standing in the electrical industry, met at the Engineer's Club in New York City, in order to hear first hand reports of the accomplishments of the California Electrical Co-operative Campaign, and so impressed were they that they have immediately set about to see how this good work may be started in other communities of the Nation. The final outcome of this meeting will be, that at the great convention of the National Electric Light Association next May in Pasadena, a full report will be presented to the Society in the minutes of the Association, setting forth the accomplishments of the California Electrical Co-operative Campaign and also recommendations as to how its good advantages may be taken to other communities of the Nation and put into practical operation.

Broad-minded men realize that the best way to secure fruitful results from a campaign of this nature is to establish it in districts, not too large, but that personal contact may be maintained constantly between all parties to the issue and between the public which it desires to serve. At the same time there must be spread broadcast the idea that such a campaign is not to put the central station out of the merchandising field, but rather to co-ordinate the work of the central station and contractor-dealer in the merchandising of electrical ware in such a manner that all may secure a reasonable return for the service rendered. This was the one big bugaboo that had to be overcome in the California plan in its early days, and today the results speak for themselves on all sides.

For many months speakers have covered the country broadcast and have heard how such a work can be done, but here is an instance where the actual results have been accomplished, and as a consequence an instance where the results speak for themselves. In all of this work, however, it is to be remembered that the California Electrical Co-operative Campaign is but in itself a mere symbol of working relationship in industry. Other organizations have contributed powerfully to its success, for instance, the California Association of Electrical Contractors and Dealers, the Pacific Coast Section, N. E. L. A., the various leagues, such as the San Francisco Electrical Development League and other institutions of similar nature, have backed the campaign from its very inception, so that its success is due, not alone to the method of organization, but fundamentally to the spirit or vision back of it all which has been of such a highly co-operative nature, and so helpful in its very make-up that success from the start was assured.

All of these facts should be well borne in mind by those in other communities considering the establishing of a similar plan of operation, and if noted with care and if the seed is properly sown, in such new communities the success of the undertaking cannot but prove assured from the start.

The Recognition of the Western Engineer

The record of work accomplished by Western engineers in the great engineering developments going on the world over is an inspiring tribute to the quality of enterprise and skill developed in the solution of the tremendous problems of the West along engineering lines. Among the engineers recently so honored are F. G. Baum, who has handled extensive electrical work in South America; H. T. Cory of Berkeley, California, who goes to Egypt on the international engineering commission; O. W. Peterson, who has been installing big undertakings in Chosen; J. H. Anderton of Stone and Webster Engineering Corporation, who goes to Japan to install a 30,000-kw. hydroelectric plant there; A. S. Kalenborn, recently returned from important engineering work in Peru; A. C. Jewett of the General Electric Company, who has been prominent in the development of the hydroelectric resources of Afghanistan—as well, of course, as such well known examples as Herbert Hoover, whose work has taken him to every corner of the globe.

AN OUTLET in need is a convenience indeed —

AN OUTLET FOR EVERY APPLIANCE

The West has long appreciated the quality of engineering talent which has developed in the ranks of its public utilities and independent engineers—and it is a source of satisfaction to find that this is being elsewhere recognized. Unfortunately in the past, the connection with large financial interests possible to Eastern men has in large measure militated against the employment of Western engineers in a consulting capacity east of the Rocky Mountains; has indeed, often led to the importation of engineers from elsewhere into Western territory, where the local engineer may have represented the highest type of talent to be obtained along these lines. As a matter of fact, there should be no distinction of engineers along geographical lines, rather upon the fields in which their experience and ability have given them special advantages. Upon all lines of hydroelectric achievement, as well as in the problems of irrigation enterprise, the West offers peculiar opportunities for daring construction and original enterprise and it will be found that in consequence, many of the engineering advances of recent years have come from this region. It is gratifying to find that this is being recognized in foreign countries as well as in other sections of our own.

Dressing Up for Company

In May of this year the West is to be visited by literally thousands interested in the various phases of the electrical industry. Many of these men are vitally concerned with electrical merchandising, and they are coming with the definite idea of finding business features worked out on the Pacific Coast which will assist them in solving their own merchandising problems. Particularly are they desirous to learn how the teachings of the California Electrical Co-operative Campaign have been applied in practice by the contractor-dealers of that State.

The electrical stores of California are to come under the critical gaze of many visitors. And these appraising thousands are the ones who will bear to the East the news of what the West is accomplishing in the institution of modern retail methods. They, above all, are the ones to transmit "the message of the West." Surely, to meet this visitation of electrical merchants from the East, and to make the most of their splendid opportunity, the contractor-dealers of California must be on the alert for even greater improvement. Now that the healthy holiday hustle is at an end, the obvious time has come to make amendments in the store-policy. Window-trims have improved immensely within the past year, yet there may be room for improvement behind the imposing store front. Let each dealer examine critically the interior arrangement of his place of business. Let him question himself as to whether it is all it should be—ready for inspection by the grand reviewing party that travels hitherward in May.

Lighting

There is a strong movement on foot to improve the lighting of factories and other industrial concerns, principally for the purpose of decreasing the number and seriousness of industrial accidents. As a by-product of better lighting is obtained an increase in production, amounting on the average to some twelve to fifteen per cent, and this at an average increase in cost of only about one per cent of the usual payroll expense.

One of the objectives of better illumination is to decrease the eye-strain of the workers. This objective is only attained when improved lighting is carried to its ultimate; when every place visited by the worker is well and plentifully illuminated. Of equal importance is the home. Usually the home is lighted by either "decorative" lights or by lights which are so low with reference to the eye that glare results. And in either case the quantity is insufficient. The abandonment of the policy, by power companies, of giving free lamps of the old carbon type is a step in the right direction; the carbon lamp could not give enough light, and its intensity was so low that it was necessary to use it unshielded in order to have much benefit from it. The introduction of gas-filled lamps of higher intensity forced the use of fixtures of the indirect or semi-indirect type, when new installations were made. Old fixtures are receiving new type lamps, much to the damage of the users.

Here is, therefore, a fertile field for power companies in extending to the homes the illuminating engineering service given larger consumers. This is not such a formidable proposition as it seems at first glance: the work could quickly be standardized so that the engineer would be able to advise the householder in a few minutes time of the proper lamps to install. This is a progressive step that should greatly ingratiate the utility companies in the hearts of the consumers they serve.

Watch for the March 1st Journal

THE STEAM TURBINE
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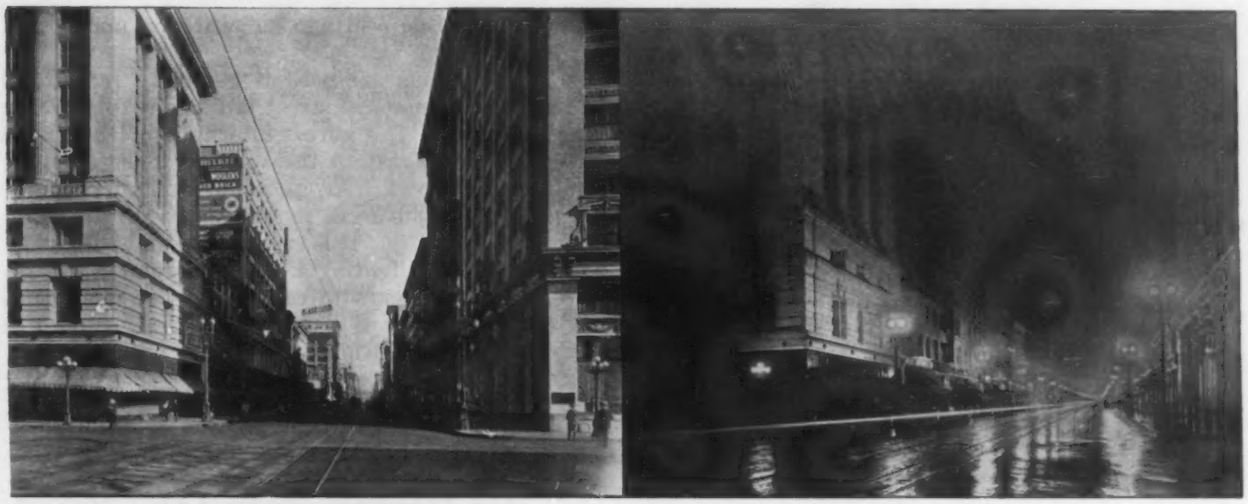

Day and night views of Broadway, Los Angeles, showing the new lighting system. The greatly increased effectiveness of the new installations is well illustrated by the corner shown in the foreground of the night view: the wall of the building on the side street is in almost total darkness, in spite of the proximity of a street lamp, while the wall of the main street is well lighted by the newly designed lamp. Photos by G. H. Bishop.

New Intensive Street Lighting

BY W. D'A. RYAN

(The value of a well-lighted street, both to business interests and to the community as a whole, can hardly be overestimated. In view of the current interest in outside illumination, the following account by the director of the illuminating engineering laboratory of the General Electric Company of the "White Way" improvements in Los Angeles, is especially timely.—The Editor.)

Adequate outside illumination in a populous city is an important safety factor as well as an asset to the community

THE popularly styled "White Way" or ornamental street lighting of Broadway, Los Angeles, had its inception through the initiative of the Broadway Improvement Association. This system consisted of 7-globe standards, 13½ ft. in height, and was first lighted in 1906, with carbon filament lamps. The advertising value to the city through this lighting has been enormous. Many hundreds of other cities have since installed the cluster system of lighting standards. It is, therefore, befitting that Los Angeles should again be among the leaders in the present epoch of "Intensive White Way" lighting of commercial streets and again the Broadway Improvement Association is responsible for this progressive step.

In 1916 a committee of this association, headed by F. W. Blanchard and E. Avery McCarthy, requested W. D'A. Ryan, Director of the Illuminating Engineering Laboratory of the General Electric Company, to design a modern system of street lighting for Broadway. In the early part of 1917 complete plans and estimates were submitted and approved. Several months later final specifications were completed and subscriptions started. The proposition was carried through in accordance with the Street Lighting Improvement Act; the property owners being assessed for both the installation cost and maintenance. The contract for the installation of standards and wiring was given to the Keystone Iron Works of Los Angeles early in 1918, but, due to the delays incident with the war, the system has just been completed. The contract for the lamps, their installation and maintenance, was let to the City of Los Angeles.

The initial installation extends from the Tunnel to Tenth Street on Broadway, a distance of approximately 7,200 feet. There are 134 standards each carrying two 6.6-ampere General Electric luminous arc lamps, equipped with the eight-panel globe with yellow Carrara glassware. Sixty-seven of these lamps burn all night; the remaining two hundred and one are extinguished at midnight. The total cost of this installation is approximately $100,000, of which $85,000 has been borne by the property owners and the other $15,000, for station equipment, has been expended by the City of Los Angeles, which will supply current and maintain the lamps. The annual cost of maintenance will be approximately $14,000, of which the city will pay less than $1,000. The first annual assessment to the property owners

AN OUTLET AT HAND is worth two that have to be reached with the step ladder—

AN OUTLET FOR EVERY APPLIANCE

was approximately $7.50 per front foot. This included the installation and the first year's maintenance. For each succeeding year the assessment will only be about $1.00 per front foot.

The lighting standards are of two designs: the Spanish Renaissance, which are used at street intersections, and the Rose design, located amid blocks. The use of two designs on the same street is a new note in street lighting and is successful in breaking up the monotomy of repetition. The general silhouette of both standards is the same; the arcs being approximately 25 feet above the sidewalk. Both standards were designed by J. W. Gosling of the Illuminating Engineering Laboratory, under Mr. Ryan's direction.

The luminous arc used is generally recognized as the most economical street illuminant for "White Way" lighting. The pure white light of the arc is an essential contrast to the warmer tones of signs and show windows. At present indications point toward further advances in efficiencies for the luminous arc electrodes. It is safe to say that Broadway has a system of lighting which will remain in first place for many years to come. As new and more efficient electrodes are developed they can be used in the present lamps without any change in mechanism.

The Value of Proper Illumination

BY F. D. FAGAN, R. E. FISHER AND HUGH W. KIMBALL

(Good lighting increases production, safeguards life, beautifies the home and serves the community in a thousand other ways. A full discussion of this important subject is presented in the following paper by the district salesmanager of the Edison Lamp Works, San Francisco, one of the advance papers from the Pacific Coast Section, N. E. L. A. 1920 convention.—The Editor.)

The great war, however expensive in human lives, production and arrested development, has had its compensations. It is hardly unreasonable to believe that medical science by its war experience has not accumulated knowledge which shall enable it to save in future as many lives as were lost, due to direct and indirect war causes. The practical lessons in industrial co-operation and co-ordination, taught by the necessities of a long struggle have had their compensations to offset the loss of production during hostilities. On every hand inventions and developments, arrested by war, are evidencing a new vitality that is inspiring to optimism. For proof of this we need go no further than a peek into the one hundred million dollar hydro-electric development project started in California.

In the lighting field the war has confirmed many of our surmises and proven many unsupported contentions with reference to the value of proper illumination. For many years we have known that either natural or artificial light properly applied has benefited mankind somewhat, and when improperly applied has been a detriment and in many cases a menace.

By comparing accident and crime statistics and merchandising prosperity in towns with well lighted streets with towns in which the streets are indifferently illuminated, we have suspected that such comparisons were in favor of the well lighted towns. But the war, with its enforced fuel economies and dangers from night air raids by forcing us to curtail lighting, has shown us the value of proper illumination. City crime and street accident statistics have shown an increase where the lighting has been reduced.

We have known in a general way that insufficient and incorrect lighting in industrials was a brake on production and a menace to the safety of the workers. But the war with its vital need for maximum output with diminished forces was the direct cause of careful and extensive surveys being made to determine what possible helps were available for increasing output. These surveys resulted in definite surprising records of proper illumination increasing production.

Less obvious perhaps, but nevertheless important lessons have been learned with respect to proper lighting in the home. Insufficient and glaring light in the home, besides being a cause of accidents, results in eye strain and very often the permanent impairment of vision. The home influence is perhaps the most potent for good and industrial effectiveness. Proper lighting is necessary for a complete home.

So in this paper, an attempt will be made to show the value of proper illumination. It will be left to others to determine what is proper illumination and how it may be obtained. These authors will have accomplished their purpose, if what is written here may create renewed interest in correctly applied illumination, and an even greater aversion to improper lighting than now exists. For the purposes of this paper the terms, "Proper Illumination," "Correct Lighting" and "Good Illumination" may be considered synonymous. They mean, that quantity, quality and distribution of light are required to substantially accomplish the purpose for which it is intended.

Home Lighting

The value of proper illumination in city streets, stores, factories, etc., can be established more or less definitely by experiment. Unfortunately, it is not so easy to determine the value of proper lighting in the home. We know that sufficient and correct light in the kitchen tends to promote cleanliness and proper preparation of food, which affects health. We know that light incorrectly used in the sewing room, library and living room impairs vision, and if the conditions are aggravated, permanently injures eyesight. We know that serious injuries have been caused by falls due to glaring and insufficient light in stairways, halls and basements. But there are

effects due to improper lighting which are even more insidious, because they are less evident. Improper lighting affects the disposition, good temper, cheerfulness of the inmates of the home. Because these effects are psychological in nature, they are more difficult to determine and describe. The initiated know, but the average person may live with terrible lighting-conditions and be conscious of something being wrong without knowing what it is. Many of us have had a social evening at a friend's house spoiled by glaring light sources. To sit for hours before a hideous glaring living room ceiling fixture is enough to try the good temper of a saint, let alone an ordinary human being. It is this aspect of the value of proper illumination that is perhaps the least considered, if not the most important. It is second only to that of the conservation of vision. Proper illumination is necessary to a happy home, and fortunately it is a procurable commodity.

Good illumination properly applied is no more costly than poor lighting. It is within the reach of the vast majority, but like all good things, money alone will not suffice. Care and study are necessary. Co-operation between architects, decorators and lighting specialists is imperative to insure that proper lighting furnishings shall be available and properly applied.

Not all of the responsibility rests on their shoulders. In the past, apparently there has been an all too evident disposition on the part of the user to neglect the lighting of his home. It has been one of the last things considered and, seemingly, the least important, yet it affects directly health, cheerfulness and good temper. Irritability, excited by improper lighting has no doubt been in many cases the indirect cause of family differences. If the user is to enjoy the fruits of a happy home, he must give to the lighting problem the same careful consideration as he does to its other important details. Glaring light sources, whether in the ceiling fixtures, side brackets, floor or table lamps, should be avoided.

Proper lighting has the same value in the school, as it has in the home. Obviously, further comment is unnecessary.

Show Window Lighting

No one questions today the selling power of the display window. The relative rental cost of show window frontage to store floor space is ample proof that the show window is by far the most valuable part of the store. While merchants have realized this for some time, it has only been in recent years that they have recognized the full value of their windows as a sales asset.

Show windows, however attractively dressed and arranged, sell merchandise only when the merchandise can be seen. Artificial light is needed during the dark hours to complete a window and that artificial light must be properly applied if it is to be effective. Illuminants incorrectly placed and arranged may be almost as ineffective as no lights at all.

A display window is much the same as a stage in a theatre. The goods on display may be likened to the actors and the window shoppers to the audience. The good stage manager contrives to keep all glaring light sources out of the eyes of the audience and at the same time light the actors in such a way that their every move and expression may be clearly seen by the audience. He contrives to arrange his stage lights so as to have the shadows in the proper direction and to have the proper amount and quantity of light to produce exactly the effect he desires on the audience.

And so it is with the window dresser. His object is to sell goods and not to display lighting fixtures or glaring light sources. He desires to arrange his window so as to set his merchandise off to good advantage and in their true light as to quality and design.

The proper lighting of the show window takes into account the location of that window, whether it is in a small town, in the outlying section of a large city, or in the downtown business section of the large city. Clearly, a large volume of light is required in the downtown business section of the city, for the reason that a window so located is in competition with those of other merchants, and chiefly, because the streets are illuminated to a higher intensity. Consequently more light is required in the window to attract the attention of the pedestrian. A well lighted window attracts the passerby, much the same as a bright light attracts the moth. Window shopping is most effective when the busy business man is relieved of his day's cares and his mind is most receptive to his personal needs.

More and more artificial light is used for display lighting in the day time, as it has been found that proper light from within the window during the day nullifies somewhat the bad effect of reflections from the plate glass. Very often these daytime reflections are so prominent as to reduce the effectiveness of the window.

Store Lighting

The fact that nearly all stores, especially those handling dress goods, suits or clothing, use artificial light throughout a great part of the day, makes it extremely important that such stores have efficient lighting arranged so as to give the correct distribution and right quality and quantity of light.

It is impossible to estimate the value of a well lighted store, from the standpoint of the effect it has upon the consumer, because it has a psychological effect which influences one person differently than it does another. The impression received by a customer of a well lighted store is cheerfulness and ease in which to see the goods, thus giving the merchant the benefit of his well arranged counters,

A BASEBOARD RECEPTACLE by any other name would be as convenient —

AN OUTLET FOR EVERY APPLIANCE

shelves, show goods, etc. No matter how well the goods may be arranged, unless there is illumination without glare, the storekeeper will lose a great part of the good effect of his displays.

Frederick J. Pearson, electrical and mechanical engineer of Marshall-Field Company, of Chicago, in a paper before the Illuminating-Engineering Society, said: "Good lighting increases production just as it increases sales in a store. Increases of illumination intensity from 6 to 10 foot-candles have increased the cost of lighting by only 1 per cent and have been found to promote sales by 6 or 7 per cent."

The value of proper illumination to the merchant in his cloak and suit department, and particularly in the fitting rooms, where suits, evening gowns and other garments are displayed, is underestimated many times by the merchant, little care being given to the method of lighting. This should be considered carefully and illumination so arranged that it lights the entire garment rather than making it necessary for the customer to turn around toward the light in order to see the effect upon either side of the garment.

While it is true that the furnishings and fixtures of many large stores carry the design of some particular period and the electric fixtures are designed to fit this period, the particular question considered by the merchant is the design of the fixtures rather than the lighting effect upon his customer.

In these days of high wages, time is of great importance to the merchant, and yet many merchants will fail to give any consideration to the illumination of their stock rooms, thereby wasting a great deal of the time of the clerks endeavoring to locate surplus stock. This should be given more consideration as a loss of a few minutes by each clerk amounts to considerable at the end of the year.

Errors in marking and checking of goods in shipping departments are frequent. While all errors cannot be prevented, the readiness to see and read sales tickets and packing case labels is extremely important. A fairly high intensity of illumination in these departments is important, as it contributes to the elimination of costly errors.

To summarize, the importance to the merchant of proper illumination brings out two important requirements—the ability of the customer to see clearly the goods on display thereby creating the desire to buy under these conditions, and the ability to locate articles and goods on shelves quickly, thereby increasing the efficiency of the salesmen as well as creating a record for good service.

Street Lighting

It is hard to estimate the value of properly lighted streets to a city and its merchants. From an advertising point of view, there is no greater asset to a city than to have it known as a well lighted city. The Path of Gold in San Francisco has advertised that city throughout the United States, not from its name but from the fact that it was one of the greatest steps in illumination ever taken by any city; the same applies to the street lighting of any city.

The merchant does not appreciate the value of this lighting to him from an advertising standpoint as much as he should, for without good street lighting, people will not visit the downtown districts, with a view of doing what is called "Window Shopping." If the streets are well illuminated, people will take their evening strolls in the business sections and are likely to be attracted by some article on display which they may purchase the next day.

The reduction in crime from street lighting has been a well known fact for some time, but not until recently has it been forcibly brought to the attention of the country. A recent proof of the value of street lighting is that of the city of Chicago where criminal complaints increased with the shutting off of the street and other lighting as a coal conserving measure. A two days' record made public on December 6, 1919, by John J. Garrity, chief of police, reads as follows: "Yesterday, the first of semi-darkness, the report showed 56 criminal complaints, 16 burglaries, 10 robberies, 20 larcenies, 1 safe blowing, 2 murders and 7 miscellaneous, as against 34 criminal complaints the preceding 24 hours when approximately normal conditions prevailed."

Just as a city increases its illumination, it may decrease its police force. While it is appreciated that no city could increase its lighting to such an extent as to have no use for a police force, a great saving is accomplished through the city street lighting. Unfortunately, there are very few cities today that have given very serious consideration to the lighting of the residential districts and many of them are far under what would be considered a good standard of illumination, thus making it difficult for the pedestrians to go about at night without the possibility of some criminal taking advantage of the semi-darkness, either robbing, or perhaps murdering as the case may be.

Industrial Lighting

However valuable proper lighting is in the home, store and city streets, our immediate need for more and better light is in the industrial field. Extensive investigations of industries in Chicago, conducted by competent lighting experts of the Commonwealth Edison Company, in conjunction with plant managers, has awakened the lighting industry. These results indicate that a 15 per cent average increase in production is possible at an added cost for lighting of but 1 to 6 per cent of merely the labor cost. Individual factory outputs were carefully recorded during a month's run under indifferent lighting and compared to the production during a corresponding period under practically identical conditions, except for a change from indifferent to proper illumination. The results of some of these tests are briefly summarized in table I.

Class of Business	—Old Lighting— Watts Sq. Ft.	Foot Cdls. Intensity	—New Lighting— Watts Sq. Ft.	Foot Cdls. Intensity	Average Increase Produc.	Increase Cost Add. Ltg.
Iron Pulley Finishing Shop	.27	.2	1.90	4.8	20	5.5
Heavy Steel Machine Shop	.60	3.0	1.70	11.7	10	1.2
Carburetor Assembly Shop	1.00	2.1	1.90	12.5	12	.9

It will be seen that better lighting increases production and that at a comparatively insignificant cost. In the words of Mr. Floyd W. Parsons in the Saturday Evening Post, November 15 issue, this 15 per cent increase "is equivalent to the production of an army of approximately 1,500,000 workers, who consume neither food, clothing nor materials in any form; an army that produces without additional factories or machinery; an army that gives at least two-thirds of its wages to be divided between capital and labor."

We are short of the necessities of life and consequently, prices are high. During the war, approximately 27,000,000 men were taken from the ordinary pursuits of productive labor and set to destroying each other and useful material. Furthermore, these same men, owing to the stress of war, consumed more food and more clothes than they did in peace time. The result is that we have used up our ordinary reserve supply and now face a shortage of the necessities of life. Short supply and a long demand elevates prices. President Wilson's "consume less and produce more" solution of the present high cost of living seems to be a practical one.

To consume less is comparatively easy, if not pleasant. To produce more is the real difficulty. Our need for the actual necessities is so great that little effort at present can be devoted to increasing our machinery of production. Our labor supply has been reduced by the killing and permanently maiming of approximately seven million men in the war, and by the reduction in working hours obtained by many of our most productive laborers during the last few years. In this connection, the fact that Germany's new constitution has established nationally the eight hour day is significant. So the problem we face is to increase output with the same machinery of production and a greatly diminished working force. W. S. Palmer, U. S. Attorney General, says "The country needs to quit fighting and go to work on maximum production, that 10 per cent more production would cut 20 per cent from present living costs." Proper lighting offers at least a partial solution of this problem, because it has proven itself a means of increasing production.

Mr. Frederick Pearson, electrical and mechanical engineer of Marshall-Field Company, a company having extensive manufacturing enterprises in conjunction with their large department store, has made an extended study of lighting as applied to Marshall-Field Company's factories and makes the statement in a paper before the Illuminating Engineering Society, "An increase of lighting cost of 2 per cent in one installation was reflected in an increased factory production of 10 per cent. In fact, improved lighting is one of the greatest dividend producers whether in the factory, store or the office."

Proper factory lighting, in addition to increasing production, has the further advantage of reducing spoilage and factory seconds. Spoilage is a direct loss in material and labor, and factory seconds are a partial loss, since they are usually sold at a reduced price. Proper illumination reduces spoilage and factory seconds, because it enables the workmen to measure accurately and perform their functions without guessing.

A well lighted factory or office is a pleasant place to work in. The employes like it because it enables them to do their work with comfort and without eye strain, and because it shows a disposition on the part of the employer to provide them with proper working conditions. The majority of satisfied employes favorably disposed towards the management usually remain permanent employes. This results in a lower labor turn-over, and consequently saving in employment and training cost. One company estimates that the training cost of one new employe in spoilage, factory seconds and the loss of production on the machines and floor space occupied by the employe, varies between $200 and $1,000, depending upon the operator and the nature of the process. If the labor turn-over of a plant, employing 500 people, is 20 per cent, this results in a production burden of from $20,000 to $100,000 yearly.

One of the great mistakes made by large industries and department stores is their lack of consideration for their office force. This is not intentional, but little study has been made of the value to the employer of proper lighting in the office. The elimination of all glare from portable fixtures, etc., in a large office will materially affect the efficiency of the office force. Extreme care should be taken in arranging for proper illumination in the office, regardless of its size.

Proper lighting has a value in preventing accidents and in conserving vision impossible to estimate. For certain purposes, we place a value on human life, but no one can estimate the misery and sorrow occasioned by the loss of a loved one. Investigations by insurance companies, large corporations and government agencies, have found improper lighting is the cause of a surprisingly large percentage of industrial accidents. Authorities vary in their estimates between 18 and 25 per cent. From 18 to 25 per cent of our one and a half million yearly accidents is a tremendous loss to charge up to wrong lighting. It is appalling to think that each year our industries kill and maim a number of men equal to America's casualties during the great war.

Industrial accident commissions in several of our States recognize this and have issued lighting orders or codes, which require employers under their jurisdiction to install lighting of the proper quantity and quality to prevent avoidable accidents, due to lighting conditions. These codes or orders have proven their value in New York, New Jersey, Wisconsin and Pennsylvania, where they have been in effect for some time. John A. Hoeveler, electrical engineer of the Industrial Commission of Wisconsin, in a paper read before the 1919 convention of

AN OUTLET in time saves much expense later—

AN OUTLET FOR EVERY APPLIANCE

the Illuminating Engineering Society on the "Application of Industrial Lighting Codes," makes the following significant statement:

"Since the adoption of the new code (July, 1918), we have been successful in getting the new installations up to a considerably higher standard than the code minimum.

"The years of educational work of the Society (I. E. S.) and the lighting industry is bearing fruit. Almost never do we encounter resistance, in fact, it is rare to find an employer who will not voluntarily install better lighting than the code requires of him. The RLM standard dome reflector has largely displaced the flat cone in the minds of shop superintendents as about the right thing for factory lighting. Obviously, this makes enforcement of the anti-glare rule easier, since this reflector gives a better degree of shading than the code specifies as a minimum."

Rowland Leveridge, Department of Labor, State of New Jersey, in a paper on the status of the Industrial Lighting Code in New Jersey, says before the Illuminating Engineering Society:

"Our experience with plant managers in furthering the better lighting movement indicates that they welcome the introduction of the code as they realize that it permits more efficient operations of the plant. We anticipate no trouble in securing the desired results in this class. There is, however, a more or less thoughtless element in all industries which would require in some cases a close application of the education program and in others, coercive measures to bring about the desired improvements."

Mr. John H. Vogt, of the New York State Industrial Commission, says:

"There still remains a great deal of work to be done to bring up factory lighting to the code rule standard. A good start has been made and the Industrial Commission will not rest until this important feature of factory inspection has been thoroughly accomplished."

Other states, among them California, Ohio, and Oregon have recently issued lighting safety orders and other states have them under consideration.

Summary

We have tried to show that proper illumination has a value to the individual and the nation, because it prevents accidents, conserves eyesight and promotes healthful and happy conditions in the home and school. We have indicated that correct lighting is a positive sales factor to the merchant; that it is necessary to promote sales in the store and show window. We have pointed out the value of good lighting in the prevention of crime and accident and the promotion of merchandising prosperity, when applied to our city streets. We have laid particular stress upon its value in the factory and shop, in preventing accidents and wastes and have touched upon the vital part it can play in increasing much needed production.

Good lighting touches our daily life so intimately and has such great possibilities for positive value to us, that it deserves more careful consideration than it has received in the past. Invention and development, both in the generation and application of artificial light, has been so fruitful in the last quarter century that proper artificial illumination is now within the reach of the vast majority. The cost is comparatively low and the information on how to obtain it is available if the user will take the pains to obtain it. Architects, decorators, lighting specialists, lighting equipment dealers and contractors should be in a position to advise the user with reference to his lighting.

The authors feel that this paper would be incomplete, if it did not contain a word of suggestion to those interested in the sale of light, or the means of obtaining it. The seller's best interest is served by serving the interest of the ultimate purchaser, the user. It is the consumer of lighting equipment to whom proper lighting is of the most value. It is, therefore, to the seller's profit to help the user obtain what he should have, proper illumination. He can do this only if he is acquainted with modern lighting furnishings and the latest practice. The underlying fundamentals of good lighting are so well known today and this knowledge is so easily obtainable, thanks to the Illuminating Engineering Society, and the larger companies selling lighting energy and equipment, that there is little excuse for those interested in the sales of lighting equipment to not be in a position to give sound advice to the user.

An enterprising dealer, N. W. Mentz, has opened an electrical shop in the busy Commodore Concourse of the Grand Terminal, New York City, where many thousands of people pass through on their way to and from the trains each day. The commuter stops in the morning and picks out a new fixture for his living room, and stops in the next evening and takes the package home. Space is necessarily limited and expensive, and window displays must be exceptional and attractive.

Co-operating with Architect and Builder

BY GARNETT YOUNG

(One of the greatest hindrances in the development of the electrical home, and one which has been too little realized up to the present time, is the absence of baseboard receptacles in the average dwelling. How the cooperation of builder and architect is needed to remedy this condition is analyzed in the following paper, to be presented at the Pacific Coast Section, N. E. L. A., Convention in May. The author is a member of the Garnett Young Company of San Francisco.—The Editor.)

As it is well known to all members of the electrical industry, there exists today a very active and growing demand for electrical devices and appliances of varied domestic types and usefulness. This demand has lately far outstripped production, and the shortage is most acute in the case of the labor saving group. Of course, this is building upon a very solid foundation. What is there in the wide world more desired by the average human being than to escape the hardships of physical labor. The well to do and wealthy have long been accustomed to accomplish this by the hiring of servants, but in the present domestic problem, such help is scarce indeed, so the obvious alternative is to utilize what labor saving devices may be obtainable, and here we have the first explanation of the phenomenal impetus given of late to the demand for washing machines, ironing machines, dish washers and vacuum cleaners. The increasing publicity has brought these labor savers to the attention of the humbler families, and now many a good housewife, who never aspired to the luxury of a servant, saves both her back and her strength by utilizing electricity's latest reliefs to household drudgery. So no longer can we associate electricity in the home merely with lights, or with the now altogether common articles of convenience, as flat-irons, toasters, percolators, heaters, etc., for the field has broadened again and dire necessity, not mere convenience, is now served by these modern inventions, which, indeed, constitute a boon to the human race.

Occupying such a place in the daily routine of life, it then behooves each of us in our own industry and associated vocations and professions as well, to bring these labor savers and comforts of electricity within reach of the greatest possible number of users. The field has only been scratched (the saturation today is estimated at about 10 per cent) and the demand, heavy as it is now in relation to production, we all must realize is meagre compared with what it will be in the future if intelligent and effective effort is put forth to clear the track of known obstacles.

Obstacles to Progress

Let us then consider the obstructions. Ask any electrical dealer what limits most his sales of appliances and you will almost always get the same answer, i. e., the premises are not wired to accommodate the articles and, moreover, in the case of washing machines, ironing machines, dish washers, and ranges, no space has been provided in laundry or kitchen in which to locate them. The buyer then faces the expense of alterations and additional wiring which, to the average housewife, seems extravagant and perhaps prohibitive, and which, we must admit, is all out of proportion to what the cost would have been had these simple requirements been provided when the house was built. (The author of this paper has a neighbor who has just installed in his living room two flush wall receptacles to accommodate respectively a piano lamp and a portable lamp, and the cost of the two outlets was $24.70. Most of us can cite cases of this kind, involving much greater and more disproportionate expense, which have come under our observation.) Although the prospective buyer may have been sold on the electrical idea and really wants the device, being willing to pay its purchase price, there is a psychological reaction and revulsion of feeling on the point of paying, in addition, the cost of remedying the result of someone's neglect or oversight that now blocks the way. With a feeling akin to resentment, the prospect may throw up her hands and decide to do without, consoling herself with the thought that she cannot afford such an outlay. (As a matter of fact, she is deceiving herself because she cannot afford, regardless of the price, to do without a means of saving herself daily labor or providing increased comforts.) You can imagine how this situation is intensified if the prospect is not the owner but merely a tenant of the house and must, therefore, pay for wiring and outlets to be permanently installed in her landlord's premises. There is a point where human nature revolts at imposition. Why, then, we are now entitled to inquire, is not the home, whether house, flat or apartment, properly wired in the first place to avoid such complications? We are coming to that.

Practically all living abodes (houses, flats and apartments) are designed not by the ultimate owner or tenant but by an architect or building contractor, hence these vocations become a link in the chain of our troubles. No sooner do we start out to investigate why the architect and builder slight the electrical requirements of a home than we uncover some bonafide alibis to any charge of neglect brought against them.

Misusing the Lamp Socket

The first invasion of the home by electricity, and this was the only domestic development for many years, was in the field of illumination and to this day electric light means a lamp and a socket just as it did in the beginning. Later came switches

THREE IS A CROWD, when you want to attach three appliances to the same lamp socket —

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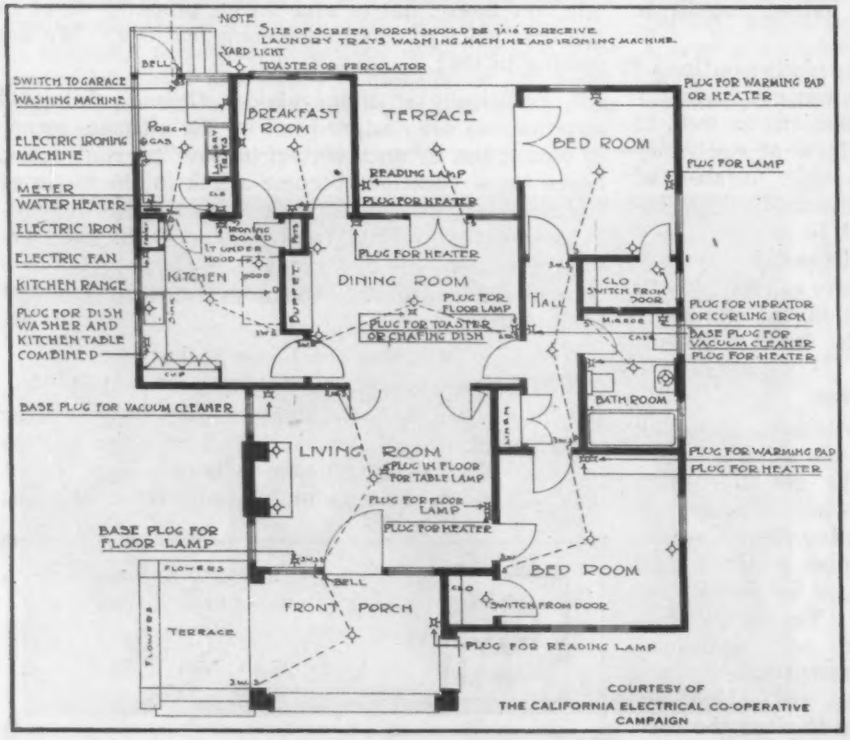
as a more convenient means of current control and the architect and builder adopted them. The switch, however, did not replace but only supplemented the socket and here you have in combination the two articles associated together in the public mind as the whole answer to the employment of electricity—the socket for connection and the switch for control. But in recent years came the introduction of the electric flat-iron, which was but a forerunner of a great variety of heating and cooking devices, and, notwithstanding the increased wattage involved, the manufacturers designed and exploited these articles as "lamp socket devices," and they were so termed by the jobber, dealer and lighting companies in passing them along to the ultimate consumer so, again, the public had confirmation of its original conviction with the natural result that weighty articles like flat-irons, toasters and percolators dangled from cords which tugged and pulled at their moorings, i. e. —the helpless socket pinioned to the chandelier or wall bracket.

Who then is responsible for the popular dependence upon the socket for double duty—first to accommodate the lamp and, then by removing the latter, to accommodate a utilization device? Who then is to blame if the house-wife, with supreme trust in her faithful and versatile socket, expects it to also serve her for motor driven appliances such as vacuum cleaners, washing machines, ironing machines, etc.? Is it not customary for an industry to do its own pioneering along educational lines? Why then blame the architect and builder, who are primarily engaged in the designing and construction of homes, if they do not take the initiative in rectifying a blunder of the electrical industry? The most we can reasonably ask or expect is that, at this late date, they join hands with electrical manufacturers, the underwriters, the inspectors and electrical contractors in a conscientious endeavor to wise up the public that sockets, connected as they generally are to light fixture cord or wire, are best suited for lamps only and certainly must be limited to low wattage devices, while modern flush receptacles of the enclosed contact type, fed by No. 14 code wire or larger, are necessary and safer for the heavier current consuming articles and appliances. The flush wall receptacle then is the answer—for at one and the same time it kills off the nuisance of removing lamps from sockets, the unsightliness of the suspended cord and the danger from overload.

Appreciating a Situation

After absorbing this bit of education then the public will be better prepared to understand the necessity for special wiring and connections to feed and control the operation of an electric range and, with a general appreciation of all these points, it is inevitable that living quarters will be electrically wired in the proper style when the premises are under construction.

Surely we cannot assume that the architect or builder will oppose this program if properly placed before them. Never. The architect, artist though he is, will not scorn to give heed to the essential necessities and practical conveniences to which his clients are entitled. The builder, who constructs houses on a commercial scale, has the additional incentive of self-interest which, aside from consideration for his client, will ultimately dictate his attitude. He will quickly learn that houses with incomplete electrical installations or unattractive fixtures will neither sell or lease so easily as houses that are properly equipped. He already appreciates what a garage means to the desirability of a house.



The properly wired home is fitted with convenience outlets for every kind of electrical appliance, so that it is never necessary to unscrew the lamp from the socket in order to use iron, toaster or heater. If houses were adequately provided with plugs at the time of building much expense would be saved later and the use of electrical appliances would be greatly increased.

The world was a long, long while in bridging the span from the flickering wax candle to the carbon filament, but once there, and with electricity in the saddle, we have rapidly progressed. Now the people want and demand in their homes not only perfect illumination, artistically provided, but all other available comforts and particularly labor savers in the daily routine of domestic grind, namely—heating, ventilating, cooking, dish-washing, house-cleaning, laundering, etc. We are not picturing a dream of the future but a reality of today. Let any skeptic investigate the facts and learn to his amazement of the mounting millions of dollars invested annually in these goods by householders.

Co-operation As the Solution

If the foregoing may be taken as establishing our premises, that is to say, a need for cooperation between the electrical industry and the allied professions of architect and builder, then let us endeavor to summarize our case and specifically set down the things we want of the architect and builder to accomplish which we are tendering our offer of co-operation. The objects sought are:

First. A complete wiring installation in each new house (and this would include all living abodes) providing, first, for illumination on a liberal and decorative scale, and, second, for the utilization of electrical devices and appliances—the householder being the beneficiary of this foresight at normal cost.

Second. The specification and actual use in these wiring installations of materials of known quality thus insuring to the consumer maximum reliability of service and reflecting credit upon the electrical industry.

The subject allotted for this paper, you will note, takes an interrogative form "How should the electrical industry co-operate?" We have now reached that stage of our discussion where, with our objectives defined, we may proceed to a consideration of the best and most practicable means of attaining same.

Let us first and forthwith dismiss the old idea of each manufacturer going at it single-handed. For years the architect and builder have been besieged by individual manufacturers in the interest of their respective products but such solicitation could hardly be regarded as co-operation, rather the reflected activities of self-interest demonstrated in the usual commercial style. There is no doubt at all but that this competitive scramble for the good will of the architect and builder has done a lot to acquaint these professions with the individual brands of wiring materials. It is equally certain that this incessant solicitation is largely responsible for the reputation which these professions bear as to being hard to approach or get at.

It is to be hoped that we shall be immediately able to convince Mr. Architect and Mr. Builder that the idea of co-operation **now in our mind** is something entirely different, founded on the constructive and enduring principle of better service to the public comprising the people who are first the clients of the architect or builder and immediately thereafter the patrons of our industry. Moreover, the present appeal is shorn of individual selfishness in that it comes not from the manufacturer alone but from a united industry embracing manufacturer, jobber, contractor-dealer and central stations.

Attacking the Problem

An outline of a suggested procedure follows:

First. We must let the architect and builder know what we want and the suggestion is made that the electrical industry state its case briefly and offer its co-operation through the medium of advertisements placed in the respective magazines or publications of these professions. This would be the opening gun and should not be fired until the rest of the plan is ready to be put into operation.

Second. It is suggested that different sets of typical wiring plans be prepared, suitable respectively for one-story residences, two-story residences, and apartments; that these plans clearly locating all outlets, be incorporated in a pamphlet with just enough reading matter to make simple explanations. The pamphlet should be in attractive, even artistic form, showing interior views of rooms with everything in the way of furniture and fixtures in good taste, and on the page opposite to each of these pictures should be a diagram indicating the position of outlets necessary according to the latest good practice. Such a pamphlet should be entirely suitable for an architect to hand over to a client as a basis of study and decision on the electrical requirements of the home. Leading to this purpose, it would be well to briefly emphasize two points, namely—the economy to the owner or tenant by having the wiring provided in complete fashion as a part of the original work, together with the unquestionable value to the premises, either for sale or for lease, by the inclusion of such electrical facilities with their strong appeal to every housewife. This pamphlet should be placed in the hands of every architect and builder in the Pacific section with the advice that additional copies may be had for the asking.

Third. Field men of ability and training should be employed whose business it would be to make personal calls upon architects and builders and with the above described pamphlet in hand review its picture story and satisfactorily explain any application not clear or not fully accepted. At the same time this expert should acquaint his man with the merits of the present offer of co-operation from the electrical industry, reaffirming the premises hereinbefore set forth. It is believed that interviews of this character, undertaken by high class men, will lead to a better understanding with results pleasing not only to the architects and builders but to their clients.

A CONVENIENCE OUTLET turneth away wrath—

AN OUTLET FOR EVERY APPLIANCE

Fourth. It is recommended that a substantial proportion of the local newspaper advertising done by the central stations and contractor-dealers, in their appeal to the public, be concentrated on the complete wiring of the home. Such copy should occupy perhaps a half-page of the paper and contain the floor plans clearly diagramed with the location of washing machine, ironing machine, electric range, dishwasher, vacuum cleaner and sewing machine, etc., with respective outlets, indicated just as boldly as the location of the bath tub or kitchen sink. As a matter of course, outlets should be indicated for the accommodation of various table devices employed in the dining room and the kitchen, also for electric heater in the living room, bath room, etc. As for lights, the outlets for piano lamp and table portables would be as prominent as the outlets for the customary ceiling and wall fixtures. The advertisement should be topped with directions that would cause the prospective home builder to cut it from the newspaper and keep it against the day construction would start. Each and every one of these ads should carry the injunction to use only high class material to insure reliable service and ultimate economy. These same floor plans, accompanied by a modified appeal, should be occasionally run with the object of accomplishing the wiring of old homes, the owners or tenants of which being shown that extensions by means of surface raceways are neither unsightly nor very expensive. Better resort to this remedy than go without electricity's aids.

Fifth. Electrical manufacturers, particularly those producing devices and appliances for domestic utility, do a great deal of national advertising. Arrangements should be made insuring that each and every one of these ads carry some uniform slogan which might read about as follows and be blocked off in form to attract the reader's attention:

> "Wire the home complete for sufficient, convenient and decorative illumination as well as for the use of modern labor-saving appliances. Enjoy the comforts of electricity. Insist on quality materials throughout."

An advertisement including this feature will sell the electrical idea to the public because it carries a broader and more effective appeal than one devoted wholly to proclaiming the exclusive virtues of the advertiser's own goods. We want team work in this national advertising for the advancement of the general cause.

Sixth. It is recommended by the Commercial Committee, responsible for this paper, that all of the foregoing suggestions be taken in hand and exploited by the California Electrical Co-operative Campaign, which functionary has already demonstrated its ability to cope with such problems. That institution has available part of the machinery for carrying into effect this program and should be equipped with necessary funds to round out its complement for energetically undertaking the work. The Co-operative Campaign is representative of and supported by all branches of the industry which facts qualify it to best serve as the go-between for the industry and two allies whose thoughtful interest and help we desire to obtain.

Finally, reviewing our six recommendations, it is observed that half of them are devoted to specific ways and means of assisting the architect and builder in holding up their end of the responsibility in the domestic application of electricity, with their clients as the ultimate beneficiary. In the remaining recommendations, we outline the steps which the industry will take to reach the public direct, thus lightening the burden of educational effort falling to the lot of the architect and builder. All the expense of the several activities to be assumed by the industry which only asks the architect and builder to accept in good spirit its tender of constructive co-operation.

The Grand Electric Company of Portland, Oregon, have just remodeled their store front as shown in the photograph. This company, which has been in business over ten years, specializes in lighting fixtures but also does general merchandising and wiring.

A young fig orchard in Fresno county irrigated from underground sources through the aid of electric pumping. The permanency of the water table not only affects the power company directly in the maintenance of their pumping load, but the entire prosperity of the thriving agricultural districts they serve.

The Permanence of Electric Pumping in California

BY CHARLES H. LEE

(The electric pumping load is a large and profitable one in the drier districts of the West, but in undertaking new enterprises of this kind it is necessary for a power company to be assured of the permanency of the underground water supply. Some of the conditions which affect these natural reservoirs, together with consideration of actual practice and state regulation, are here discussed by the president of the California State Water Commission.—The Editor.)

The past twenty years have witnessed a phenomenal growth in the use of ground waters for irrigation. This commenced in Southern California during the dry period from 1898 to 1905, when the force of circumstances compelled the search for sources of underground water to supplement the diminished surface supplies. The success attained by these early efforts led to continued use and further development after climatic conditions had returned to normal in 1905. At the present time between one-third and one-half of the irrigated area of Southern California depends upon ground water supplies derived from wells.

Changes in Pumping Equipment

Irrigation development in the San Joaquin Valley has been very rapid since 1900, and following the practice in Southern California, ground water supplies have been largely drawn upon for extending the irrigated areas. The proportion of the total area irrigated from wells in 1912 was ten per cent, and at present exceeds fifteen per cent. The use of underground water in the Sacramento Valley has not been extensive, but with the growing recognition of the benefits of irrigation and use of normal stream flow the day is not far distant when underground supply will be given attention.

With the increased use of ground waters there has been a change in source of power for pumping. The internal combustion engine or steam plant was most common in the earlier years of irrigation pumping. It could be set up quickly, without the delay and expense incident to securing connection with an electric transmission system laid out primarily for a municipal load. As time went on, however, the value of the irrigation pumping load was recognized by the hydroelectric public utilities. Transmission lines were built into pumping districts and changes were made in standard electrical equipment, adapting it to the special requirements of the new service. The convenience and reliability of electricity as a source of power soon won general favor, especially among small consumers, even where the expense was greater. The disproportionate increase in the price of fuel oil during the past few years, together with State control of public utility rates and service, has operated in favor of electricity in the matter of cost.

Influence on Load Curve

The result has been an entire change in the character of the central station load curve, not only the daily curve, but the annual. The daylight trough has been filled during the irrigation season and the summer trough in the annual curve has been replaced by a ridge. The latter condition is not a disadvantage. The irrigation pumping load corresponds in proportionate amount and time to the use of gravity irrigation water. Hence, the greatest source of conflict between irrigation and power interests is disappearing, and in its stead is an opportunity for cooperation in storage of flood and winter waters.

THE EARLY WIRER catches the electric appliance—

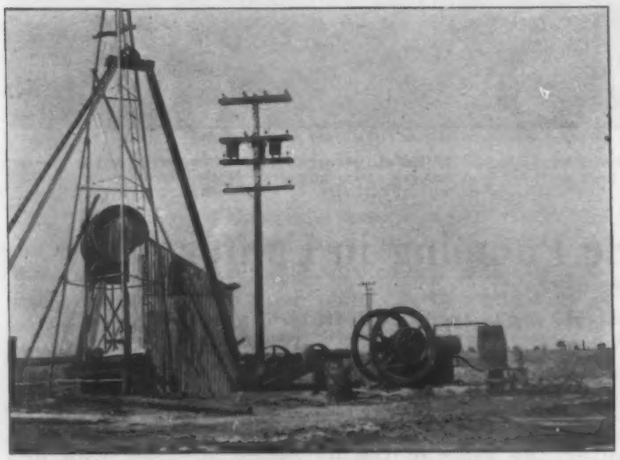
AN OUTLET FOR EVERY APPLIANCE

The accomplishment of this storage is one of the most pressing problems now facing the people of the state.

The large and rapidly growing volume of business represented by the irrigation pumping load brings with it an added responsibility to the corporation management.

The Factor of Ground Water Supply

In the early years of ground water development the adequacy of a new well or group of wells as a source of supply was considered assured if the test yield was large and attained without serious draw-



With the increased use of ground waters electricity has won out over other sources of power for pumping, owing to its convenience and reliability. This is an instance where a gas engine replaced a windmill as a source of power, and both have been superseded by an electric motor.

down of the water level. The success of one development led to others and before long whole orchard districts and communities were laid out depending entirely upon the local ground water supply. In such a district the business of a power company for all purposes depends largely upon the permanency of the ground water supply. Experience has shown that there are practical limits to ground water development, and with too great withdrawals, extensive and permanent lowering of the water levels occur over more or less widespread areas. In one outstanding instance in the San Joaquin Valley, a large area of highly developed land has been forced to take drastic measures in order to continue its present state of productivity and community life. Other districts are observing marked lowering of water levels from year to year, and may have to take similar steps unless the return of normal climatic conditions with increased rainfall and runoff relieves the situation.

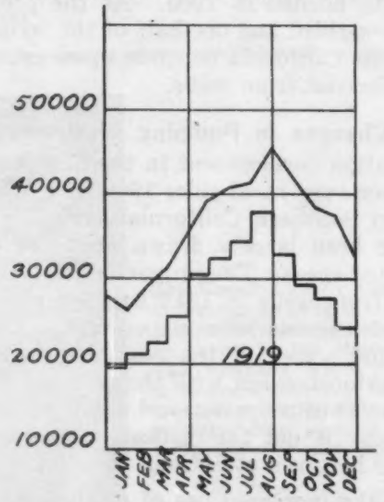
A hydroelectric power company going into a new pumping territory or planning for increased business in one already occupied cannot afford to disregard the question of the future permanency of the ground water supply.

Estimating Water Resources

The mystery and uncertainty which formerly prevailed with regard to the occurrence and movement of underground water has to a large extent been dissipated. It is today even possible, by means of scientific observations and study, which can be conducted by the specially trained hydraulic engineer, in many cases to make quantitative estimates of the amount of ground water available for development in a given district. This progress has resulted largely from the demand for information required for complete utilization of ground water resources in the southwestern states, but particularly in California. The scientists of the Ground Water Division of the Water Resources Branch of the U. S. Geological Survey have done much to bring information together and formulate general principles and terminology, but the initiative has been taken and the pioneer work done by the practical hydraulic engineers of the Southwest. These men have opened a new field of engineering endeavor, one which has been recognized in Europe, and especially France, where its practitioners are termed L'Ingenieur-Hydrologue. In America the work of the hydrologic engineer is based upon a broad foundation of data and practical experience. The management of hydroelectric enterprises, therefore, does not necessarily face an indeterminate problem when considering the future behavior of ground water levels in a given district, but may obtain technical advice of recognized value from the trained "ground water hydrologist" or "hydrologic engineer."

Underground Reservoirs

The economically important ground water supplies of California are extracted from porous and usually unconsolidated accumulations of gravel, sand and clay. These deposits occupy geological depressions or basins in the earth's surface and are usually found beneath valley floors and occasionally bordering lakes or bays. The extent and depth of these deposits vary, depending on the area and depth of the geologic depression or basin which they occupy, the amount of available rock debris in the adjacent



Typical load curve of power company serving irrigation districts. The growth of electric pumping has made the summer load a peak rather than a valley. The power company and the irrigationist are today cooperating in encouraging mountain storage for winter waters.

hills or mountains and the activity of the streams engaged in the work of transportation. In the case of the Sacramento and San Joaquin valleys, the deposits cover several thousand square miles, but have

many subdivisions forming relatively small local ground water districts. The coast and southern California valleys are generally small, few exceeding 100 square miles.

The deposits of porous water-bearing materials are usually surrounded by relatively non-porous formations. The latter are represented by the encircling or bordering hills, thus forming enclosed subterranean basins or reservoirs. In fact, the resemblance is so great that the term "underground reservoir" has come into general use by engineers and the courts. As suggested above, these underground reservoirs may not always correspond in extent to the valley floor. In fact, because of buried hills or ridges or differences in porosity, or alluvial material at different distances and directions from the point of discharge of large streams from the mountains, a valley may be divided into a number of almost independent underground reservoirs. It is the first step in any investigation of ground water to determine the limits of each underground reservoir in the area being studied, for each must be considered as a separate unit in its behavior with pumping.

Inflow and Outflow

Carrying the reservoir analogy further, it can be readily appreciated that in order that a permanent ground water surface or water table may be maintained, there must be a continued or recurrent source of supply and that no more water can be withdrawn from an underground reservoir than enters. These are the basic principles upon which quantitative estimates of ground water supplies are made. They are also the requirements upon which permanency of ground water supply depends.

The principal source of supply of underground reservoirs is runoff from rainfall and snowfall on the adjacent hill and mountain slopes. This water flows out upon the valley floor from various canyons and is more or less absorbed by the underlying porous material, either directly from stream channels and ditches, or from irrigated areas. The importance of the latter is indicated by the observed rise of 50 feet or more in the Fresno district since the practice of irrigation commenced.

The water thus absorbed sinks to the general water plane and moves slowly toward the lowest part of the valley. Some escapes at springs and seepages into natural channels, a small amount may escape as underflow, but the largest part is lost by evaporation from moist soil and vegetation. The latter occurs from cultivated crops, natural swamp vegetation, or from damp alkali-crusted land. Pumping from wells is an artificial avenue of escape of water from an underground reservoir.

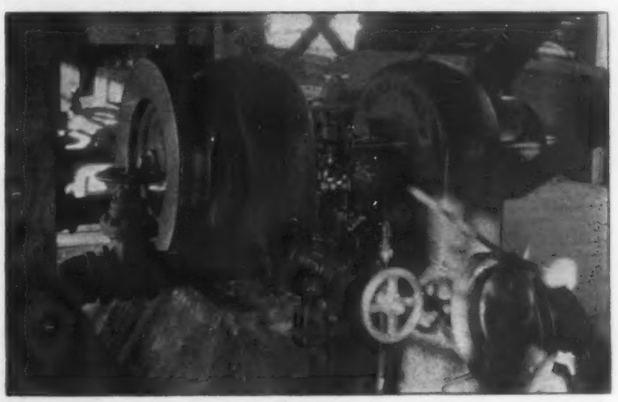
The relation of inflow to outflow for an underground reservoir as for a surface reservoir is registered by the vertical movement of the water surface. Rising water level or increasing artesian pressure indicate an excess of inflow; falling water level, or decreasing artesian pressure, indicate a deficiency. The adjustment of differences between outflow and inflow caused by climatic variations or artificial changes, such as introduction of irrigation or extraction of ground water by pumping from wells, is accomplished by the increase or shrinkage of the evaporating area and of overflow into natural channels. The determination of the quantitative limit of development from an underground reservoir involves not only observations of ground water level fluctuations, but must also be considered from the broader relation of inflow to outflow. In instances where pumping draft and residual natural losses by evaporation and seepage into streams exceeds normal inflow, there will be persistent lowering of the water level and ultimate abandonment of pumping from at least a portion of the district. It is this situation which should be avoided by the exercise of foresight before the investment has been made.

WATER WHEELS FOR BRAKING AND INITIAL POWER

BY CHAS. H. TALLANT

(How inconveniences of location were overcome by an interesting installation, making use of the available water power, is here described by a member of the Pelton Water Wheel Company of San Francisco. —The Editor.)

An unusual and unique use of water wheels has been made in a California installation, at the Plumas County plant of the Spanish Peak Lumber Company. The installation is on the company's timber project,



A water wheel installation on a timber project furnishes the power for an aerial tramway and drives a generator for lighting purposes

where water power is available but direct access to the railroad impossible. Two Pelton water motors, set in opposition, have been adapted to an aerial gravity tramway control to furnish power and braking effort as well as to drive a generator for lighting purposes. The motors furnish all the primary power for the cableway and the braking effort when the cableway is loaded.

The cableway is fundamentally a gravity system, but due to the difference in elevation of the

MANY CONVENIENCE OUTLETS
make light work—
AN OUTLET FOR EVERY
APPLIANCE

loading and discharge station and the length of the cable, power is required for braking when loaded carriages are hung on the way, and for driving the tramway with the cable unloaded. The cableway has a total length of 27,200 feet, crossing a ridge of 4,900 feet elevation between the loading station at the mill and the discharge station at the railroad right-of-way, while the discharge station is 890 feet lower than the loading station. A braking effort to absorb a maximum excess of 12 hp. is necessary when the way is fully loaded, and a torque of 20 hp. is required when the cable is not loaded.

Two 24-inch Pelton water motors, rigidly connected in opposition through a solid coupling, make up the driving and braking unit. They are controlled by needle nozzles, actuated by oil governors, in regulating the cable speed, regulation being to hold speed constant. The governors are so adjusted that when the cable slows below normal speed due to a light load, water is admitted to the driving motor, and power is generated to hold the speed constant. When the cable is loaded and the speed tends to increase, the water is shut off the driving motor and admitted to the braking motor. The impact of the buckets of the braking motor rotating against the jet develops the requisite braking effect and holds the speed normal.

Water for the system is taken from an old mining ditch above the mill, with an effective head of 230 feet. Several smaller motors are energized by water from the same supply, for driving small utility machines in the mill. Electricity for lighting the mill and other buildings is generated in a 15 kw. alternator, belt-driven from the flywheel of the main water motor unit. Fire protection is also provided by water from the ditch.

The handling costs for the cableway have been well under the contractors' guarantee of $2.40 per M. board feet and operation has become so successful that the company's entire stand of 200 million feet will be moved to the railroad at lower than that figure.

Storage Battery Locomotives in Hetch Hetchy Tunnels

BY PAUL J. OST

(The Hetch-Hetchy project is notable not only for its extent as a water and power scheme, but for the variety and completeness of the equipment which is being used in its construction, the locomotives described below being among the examples of this. The author of the article is electrical engineer with the Bureau of Engineering, City of San Francisco.—The Editor.)

The City of San Francisco on its mountain development of the Hetch Hetchy water supply is driving 18.3 miles of continuous tunnel through solid granite. This tunnel is to be lined with concrete and will be 10′ 3″ x 10′ 3″, the section being a horse-shoe shape. The rough tunnel is approximately 11′ 6″ x 11′ 6″. One division will be almost five miles in length without shaft or adit, necessitating the hauling of excavated material a maximum distance of 2½ miles.

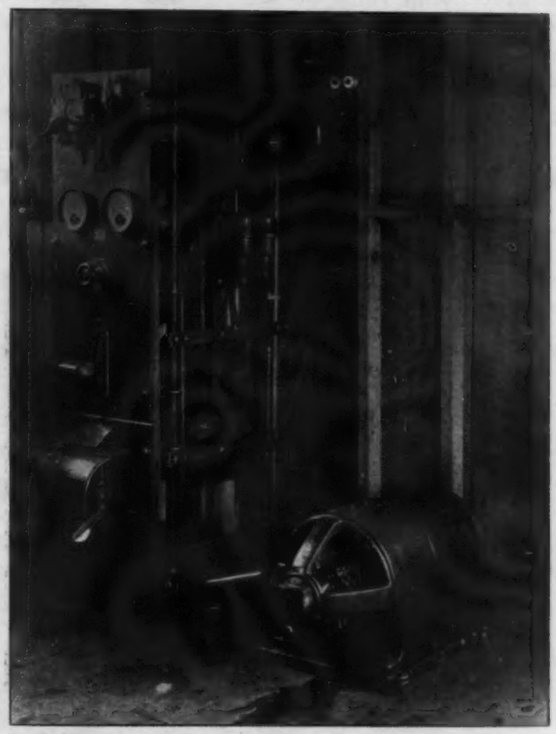
Electric train at Early Intake Tunnel. The daily mileage of one of these locomotives is from 10 to 40 miles; the loads average about 4,500 pounds each, and one locomotive will handle from 30 to 60 each 24 hours, according to the work done on the tunnel.

It will be necessary to haul into the tunnels forms, tools and workmen for the concrete lining in addition to removing the excavated material. The concrete will no doubt be conveyed through pipes by compressed air from the portal. The great length of most of the tunnel sections would necessitate the use of 600-volt direct current if overhead trolley were used, requiring that the concrete and form men work adjacent to a fairly high potential. In order to support the trolley some type of fastener would be required in the finished concrete lining.

Type of Locomotive

After carefully weighing all conditions, it was decided to purchase six electric storage battery locomotives, one for each section of the tunnel. The locomotive selected weighs 6,000 pounds without battery. It is equipped with 80 cells of Edison A-6 Battery, which, with the container, weigh 1,800 pounds, making a total weight of 7,800 pounds without driver. The average voltage on discharge is 85 volts, while the maximum voltage necessary to charge is 150 volts. The track gauge is 24 inch. The over all length of the locomotive is 10′ 5¾″ with a width of 44″ and a height of 42″. The rated drawbar pull is 1,200 pounds with a maximum pull of 1,600 pounds during acceleration, which permits handling trains weighing 50 tons, the corresponding empty car train weighs 15 tons. The selecting of the battery capacity and charging equipment was based on eight 5-mile trips in 24 hours, 2½ miles being the greatest distance from portal to the heading. The running time will consume eight hours out of the twenty-four. After making two round trips it would be necessary to recharge the batteries. The operating time indicated would allow sixteen hours out of each twenty-four for charging. When drawing a 50-ton trailing load the locomotives will make 3.9 miles per hour against the tunnel grade—0.15%. The speed increases with lesser loads, the locomotive light making eleven miles per hour.

Two very significant things were brought out in the selection of the locomotives: First, very much more efficient and satisfactory operation could be secured by equipping all cars with roller bearings, thereby making the train resistance 15 pounds per ton loaded, and 18 pounds per ton light. Second,



Battery charging equipment at Priest Tunnel. The motor-generator set and the charging panel are mounted in one corner of the special locomotive house.

good track was essential to efficient and fast operation. It was therefore decided to install 30-pound rails, with angle bar splice plates, on wood ties with rock ballast.

The locomotives purchased were built by the General Electric Company. Each is equipped with two H. M. 828 ball bearing motors which are to all appearances miniature street railway motors being connected to the axle through the standard form of railway single reduction gearing, the pinion and gear being enclosed in a malleable iron gear case.

Charging Equipment

In order to insure proper charging without employing experienced men each locomotive is equipped with a Sangamo ampere hour meter, which runs forward on discharge and backward on charge, the ratio between the operation forward and reverse being such as to compensate for the battery efficiency. The zero position is equipped with an auxiliary contact which not only opens the d.c. circuit breaker, but also trips the a.c. starting compensator, shutting down the motor generator set automatically upon the completion of charge. The motor generator set is of 15 kw. capacity and consists of a 440-volt, 3-phase induction motor, direct connected to a 150-volt d.c. generator. This, together with a charging panel, is mounted in one corner of the special locomotive house, which consists of a small building which contains, in addition to the charging equipment, work bench and supply cupboard, a track elevated above the floor onto which the locomotive is run by its own power up an incline which lies outside the building. This elevated track permits the caretaker to work under the locomotive applying grease and making inspections, thus eliminating any chance for neglect due to inaccessibility.

Working Capacity

At the present time the maximum haul for any locomotive is between four and five thousand feet. This includes a short run out on to the dump. The daily mileage of a locomotive at present varies from 10 to 40 miles. The number of loads varies with the work done on the tunnel, running from 30 to 60 each twenty-four hours. These loads will average 4,500 pounds apiece, which includes 1,500 pounds for the car. The work at the present time is necessitating a great many trips of the locomotive light, carrying men and tools. So far, the indications are that the power consumption per ton mile is 120 watt hours measured at the motors, or 300 watt hours measured as a.c. power at the motor generator set, which compares very favorably with the a.c. power required to operate a trolley equipment using a motor generator set for converting the a.c. to trolley current. Conditions are improving all the time, and it is thought that the service under which this record was made is possibly the most unfavorable which will be encountered.

Satisfactory Operation

The operators are selected from the tunnel gangs, being the most capable of the ordinary tunnel laborers, and after a few days' instruction are placed in charge of a locomotive. So far everyone is extremely well pleased with the operation of the equipment. It might be thought that electric locomotives operating at a minimum speed of 3.9 miles per hour and requiring several hours a day for recharging, would be altogether too slow. Such, however, is not the case, the maximum and intermediate speeds proving ample for all conditions, and when hauling maximum loads, safety demands slow speed.

Another feature which has won approval for the locomotive is the fact that it has sufficient power to move either the air-operated heading machine or the electric-operated shoveling machine. Prior to the advent of the storage battery locomotive there was always considerable difficulty experienced in taking these machines in and out of the tunnels. Since April, when the locomotives were placed in commission, there has been no such complaint.

In addition to operating in tunnels opening at portals, two locomotives will be used at shafts. The shafts are 4′ 6″ square and the locomotives were de-

MAKE TOAST while the lamp shines—

AN OUTLET FOR EVERY APPLIANCE

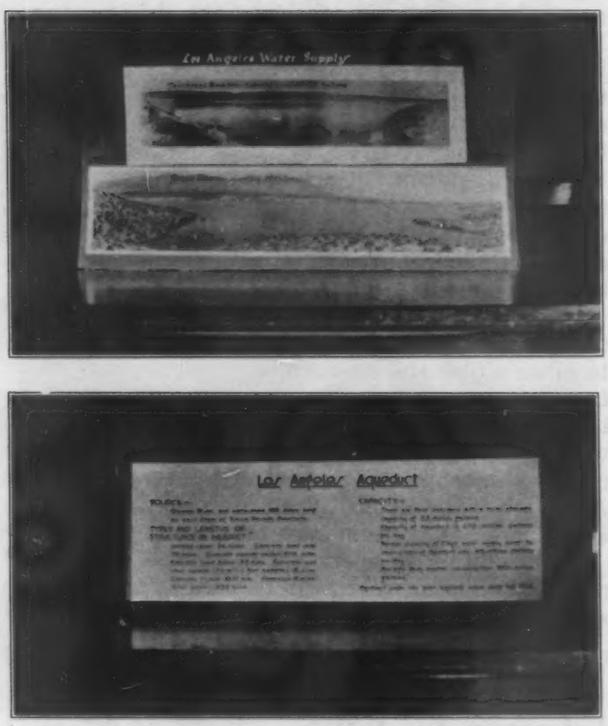
signed so that the battery compartment can be lifted off, permitting the chassis to be dropped down the shaft end first. The batteries will have to be taken out of the compartment and sent down in their crates, after which the housing will be lowered in a similar manner to the locomotive. The design of the locomotive also will permit of readily removing a discharged battery, replacing it with a freshly charged one. The present indications are that it will be unnecessary to resort to any such expedient.

It is impossible at this time to give any data on the cost of operation and maintenance other than is indicated above. Three locomotives have been in continuous service since April, 1919, without it being necessary to spend anything for repairs or renewals. As water can be obtained out of the river of sufficient purity for use in the batteries, there has been no expense for distilled water. The amount of oil and grease used is very small. In six months more it will be necessary to wash out and refill the batteries with new electrolyte. It is impossible at this time to estimate what this work will cost.

The tunnel aqueduct is being constructed by day labor under the direction of M. M. O'Shaughnessy, City Engineer of San Francisco.

Western Ideas

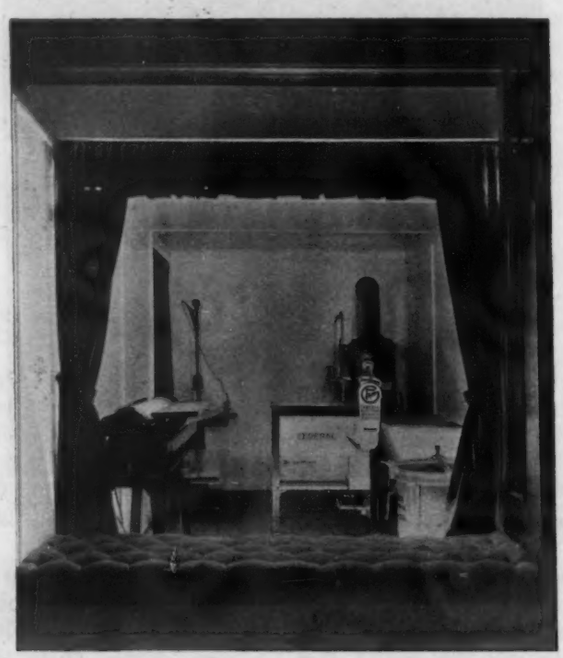
AN EFFECTIVE USE OF THE WINDOW to promote public good feeling was carried out by the city of Los Angeles in conjunction with the power development on the Los Angeles aqueduct. Photographs of the project were neatly mounted and displayed in the window, together with an attractively printed poster giving the details of the project. It was found that considerable interest was shown in the display by passers-by, who undoubtedly went on their way with a more intelligent understanding of the vastness of the undertaking and a better comprehension of the problems involved in supplying them with water and power. It has not been customary for power companies to take advantage of the advertising value of their window space, but there is no reason why this method of reaching the public should not be added to the growing belief in publicity of all kinds.



A window display which gave information to the public

A FREE ELECTRIC LAUNDRY

A free laundry, where anyone may come to do washing, is a notable enterprise undertaken by the Domestic Appliance Company of Oakland, Cal. A commodious room adjoining the Domestic Electric Appliance Company's sales room at 1533 Clay Street, has been rented and converted into a complete and thoroughly modern laundry plant. It is equipped with every up-to-date mechanical and electrical device which may be employed in facilitating laundry work and all appliances are so arranged to afford the utmost convenience for the operators. There are electric washing machines, electric drying machines, electric mangles, electric irons and ironing boards. In addition to furnishing the complete mechanical equipment, the Domestic Electric Appliance Company supplies the electricity, gas, hot water and soap—all absolutely free of charge. An intelligent courteous attendant instructs those who are unfamiliar with the workings of the various mechanical and electrical devices in the operation of the appliances.



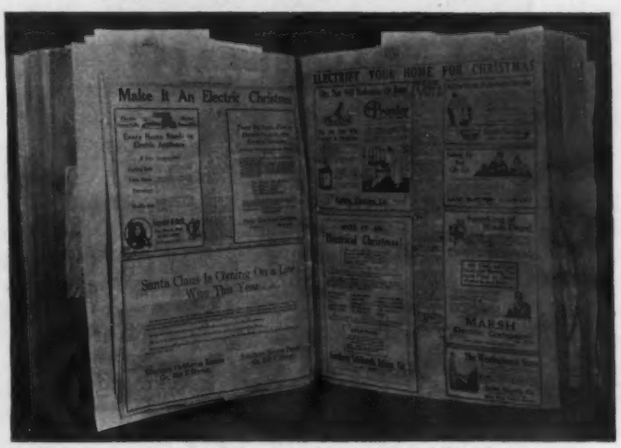
To this model electric laundry any housewife may bring her washing and reduce her labor by the use of the up-to-date electric appliances. Here are an electric washer supplied with plentiful hot water and soap, electric wringer and electric iron, all accessible without charge.

The Domestic Electric Appliance Company cordially invites every one who has experienced any difficulty in having their laundry work performed to take advantage of this extraordinary opportunity.

Electrical Co-operative Advertising Campaign

(Through advertising, the public should be made to realize that California cannot grow industrially, any faster than its hydroelectric power is developed, and transmitted to its cities. The following tells something of the constantly increasing publicity given to the electrical industry in the California newspapers under the stimulus furnished by the cooperative advertising movement.—The Editor.)

"Electrify California" was the dominating note of the recent big meeting of the Los Angeles advertising club, when the plans and partial results of the immense cooperative advertising campaign being run in California were laid before the members of the club. At the conclusion of the meeting President Ray E. Nimmo, and director A. H. Wilkins, of the Better Business Bureau of the advertising club, together with visiting representative advertising men from the various parts of the United States, stated that in their opinion this cooperative electrical



The returns from the Christmas advertising campaign in Southern California astonish even the experienced advertising men of our country, especially the figures showing the volume of publicity secured, in relation to the advertising placed, the average for the entire campaign being approximately 20%.

advertising campaign was one of the largest intensive advertising campaigns ever started in any section of the United States.

Surprising Figures —

The total figures of the Christmas advertising campaign in southern California astonished even the experienced advertising men of our country, especially the figures showing the volume of publicity secured in relation to the advertising placed, which ran as high in some cases as 50%, the average for the entire campaign being approximately 20%.

In the state of California the electrical industry ran, during the campaign, over 300 full pages of electrical advertising a week. In San Francisco district the campaign worked on a somewhat different plan, the dealer signing up on a six months basis, and even though not as big a smash effect was secured for the Christmas campaign, the average for the six months compares very favorably.

In the city of Los Angeles the volume of publicity secured averaged 25% of the advertising. A consideration of the metropolitan character of the Los Angeles newspapers, which run a higher average of advertising to reading matter than practically any other newspapers, shows that the press is vitally interested in the advancement of hydroelectric development, and in bringing before the public the many modern uses of electricity.

Electricity and Community Development —

Carl M. Heintz, promotion representative of the Westinghouse Electric & Manufacturing Company, in speaking at this meeting maintained that "We, of California, must realize that we cannot grow industrially, or our population increase beyond certain limits, faster than our hydroelectric power is developed, and transmitted to our cities for industrial and domestic uses, and to our farms for agricultural purposes."

At the present time millions of acres of semi-arid lands are lying idle awaiting intensive cultivation, while literally thousands of eastern manufacturers are looking forward to establishing factories in California, when sufficient hydroelectric power is available. The California power companies who are lending their untiring efforts to develop sufficient hydroelectric power to meet this ever increasing demand, conservatively estimate that $250,000,000 will be needed to develop sufficient power in California in the next ten years, half of which will be spent in our own state for wages, raw materials, and manufactured products. This means a great deal to individual business, since this development will undoubtedly double the population of our state within the next ten years.

Organizing Publicity —

One large manufacturer recently estimated that there is a ready market in the United States at the present time for seven billion dollars' worth of electrical appliances. The electrical industry is doing much to acquaint the public with these facts, chiefly through the California Electrical Cooperative Campaign, an association made up of manufacturers, central stations, jobbers and dealers, whose efforts are responsible for the launching of an extensive advertising campaign in the state of California.

At the present time there is a considerable amount of local and national advertising being done by various branches of the electrical industry. The central stations and electrical dealers are being induced to advertise on one page once a week, tying in with the national advertising of the manufacturers to create a smashing effect, and showing the house-

TOO MANY inconveniences spoil the labor saving device —

AN OUTLET FOR EVERY APPLIANCE

wife where the electrical appliances she sees advertised nationally can be purchased locally; the ultimate idea of the committee being to establish an electrical section in every newspaper of California, similar to the automobile section. Men interested in the promotion of this campaign have called on practically every electrical dealer, central station, and newspaper man in California, laying before them the plans of the campaign.

In Southern California the campaign is further advanced, over 125 full pages of cooperative electrical advertising appearing each week in the newspapers there.

The newspapers fully realize the importance of the campaign and are lending their support by giving these cooperative electrical pages such headings as, "Electrify Your Home," "Electrify California," "Electricity Means Freedom to the Housewife," together with from three to four columns of reading matter extolling the methods of electrification. This campaign is growing beyond all expectations, and next year the electrical industry expects to publish in California in the California newspapers no less than six thousand full pages of this cooperative advertising.

The campaign in Southern California has been conducted by A. L. Spring, field representative of the California Electrical Cooperative Campaign; Chas. H. Pierson, advertising manager of the Southern California Edison Company; H. C. Rice of the Southern California Edison Company, and Carl M. Heintz, promotion representative of the Westinghouse Electric & Manufacturing Company. It has also received the earnest support of the local electrical industry, as well as material assistance from Capt. Howard Angus, secretary for the California Electrical Cooperative Campaign, and I. W. Alexander, chairman of the publicity committee of the Pacific Coast Section, N. E. L. A.

A sample of the extensive electrical advertising being done in the Northwest, a single company taking an entire page of the newspaper. The impetus given to the publicity movement by California is making itself felt throughout the Pacific Coast.

Office Records—Their Filing and Indexing

BY IRENE WARREN

(There are four basic methods of filing but each is susceptible of various modifications, according to the requirements of any particular business. Some phases of the standardized systems and their application are here analyzed by the director of the Chicago School of Filing and Indexing, in the third article of the series.—The Editor.)

There are four basic ways of arranging business papers; by name (of the firms, individuals, or items), by geographic location, by subject, and by chronology.

For notation, we may use letters, numbers, or colors. All the systems on the market at the present time are based on these principles. Some of them combine two or more methods. In this short account, a few of the systems offering the purest types of the basic principles will be explained. If these are thoroughly understood, it will give the file clerk a method of analyzing any file he may see, and also of adapting these systems to his peculiar needs. It will also give office managers, department managers, and specialized workers in various lines, the method of planning their records in such a way that they will quickly yield accurate information when needed. Filing and indexing is one phase of efficiency work.

Choice of Filing Method

Correspondence files, today, are arranged in such a manner that they index themselves. A card index is unnecessary unless a large percentage of the letters need to have a number of different entries.

One of the difficult points in filing is to determine, especially in a new business, which is the best system to use. The alphabetic name file is the most satisfactory in the largest number of business lines. A few exceptions to name entries may easily be made, for certain types of letters that are more desirable under subject or geographic location. The letters are grouped as desired and filed in one alphabetic sequence with the names.

In many ways, alphabetic filing is the easiest to understand. This is sometimes called the dictionary, or directory method, because the words are filed in similar style. Every letter of every word is taken into account in accurate alphabetizing, just as in the directory—words are not thrown together roughly by initial letters only.

Aids to Efficiency

One of the hardest parts of filing is to know just where to enter each letter. The most intelligent clerks, with the greatest familiarity with the business, take care of this phase, and department heads often send the file clerk suggestions as to how a difficult letter will be used, when the incoming letter and carbon answer are first sent to him. Each letter is marked when the decision is made so that the letter will always go in the same place. A straight line

is drawn with a colored pencil under the name under which it is to be entered. This takes but a second as the letter is being read the first time, and saves re-reading when it is filed or returned after a loan.

The names must be written on the labels for the regular correspondents' folders exactly as they are to be filed. The label for J. C. Brown should be written: "Brown, J. C."

A file clerk when hurried ought not to be hampered by transposing names and initials. Too great care cannot be given the writing of these names, and in some of the best filing departments, the supervisor writes every one of her own labels so that she knows no mistakes occur from inaccuracies in the names on labels.

Alphabetizing is not the easy problem that so many people think it, and definite rules must be laid down for file clerks, if there is to be continuity and accuracy in the files. The rules used in the business firms differ considerably from those used in filing cards in the public library. The telephone directories in fourteen of our largest cities are being published by one firm, which has standardized the arrangement of names to a considerable extent. It is the alphabetic list with which the largest number of people are familiar, and it seems wisest to be guided by this book rather than by any other. Only a few of the main rules for entering letters and alphabetizing them can be suggested in this short account. A glance at these rules will surely indicate to the reader why so many letters are lost in files where several people are filing, each according to his own notion.

A Few Rules for Alphabetizing

In a name file, it is better to make the entry under the firm name than under the name of the individual writing the letter. Members of firms and individuals in their employ change frequently and the firm name is apt to be more permanent. Divisions of a firm may be made by departments, or by individuals in charge of departments, as desired.

The name of the firm or individual is inverted as shown below, so that the last name stands first.

Baxter, S. W. & Co.
Bentley, John C. & Bentley, J. L.
Farnham, John & Sons
Smith, Elmer

Firm names composed of last names of various individuals, stand as the official name of the firm as written. Descriptive titles also remain as written in official names.

Aaron-Johnson Co.—
Bentley, Bemis, & Doran
National Biscuit Co.

Terms like Mrs., Jr., Sr., are filed after the names.

Burr, John L.
Burr, John L., Mrs.
Doran, John, Jr.
Doran, John, Sr.

In a name file, it is usually desirable to introduce a few subjects. The file clerk makes the exception that certain letters, regardless of the writer, are to be classified by subject, and a folder is made for that subject and alphabetically arranged in the file, exactly as if the subject had been a name. If a firm has a number of subjects that it wishes to keep track of,—five, ten, twenty—it does so in this way. A subject file is not adopted unless the majority of the letters are to be classified by subject.

If a firm and a subject have the same wording, arrange the firm first.

Anderson, James, & Co.
Applications—Bookkeepers
Applications—Stenographers
Applications—Typists
Public Securities Co.
Public Securities—Bonds
Public Securities—Stocks

A foolish little rule, "Nothing before something," has pulled many a file clerk out of a tight place. Finish the first unit for filing, before taking the next word.

Anderson
Anderson, J. C.
Anderson, John
Anderson, John C.
Anderson, John Cotton
C. H. L. Belting Co.
Chic Store
Chicago Belting Co.

Enter all letters under the official name of a corporation or institution.

Chicago, Burlington and Quincy
John Crerar Library
Johns Hopkins University

If an institution is locally much better known under a nickname or shortened form, it may be better to keep the letters under that form, and make a cross reference from the official title to that form.

Examine the telephone book, gazetteers, and other reference books, and the public library card catalog for treatment of "St," "Mac" and "Mc," and other puzzling points.

Recognized Importance

Filing and indexing, as it stands today, is one of the unstandardized lines of clerical work, in many places looked down upon, and ranked below typing, while in other concerns, it has the recognition of a separate department, with a trained supervisor and specialized equipment.

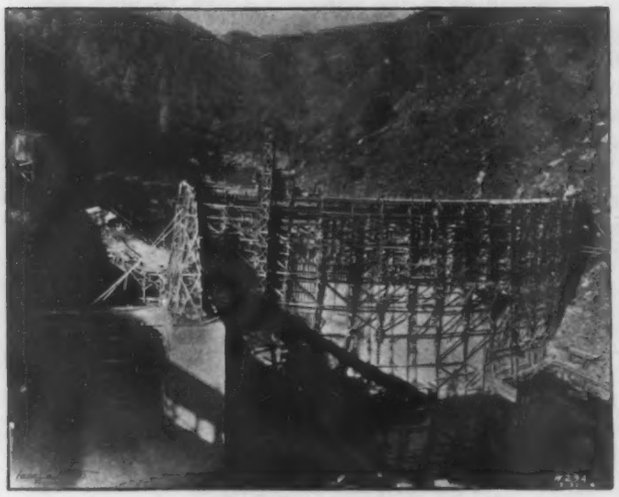
Filing departments, which a short time ago were tucked off in basements, attics, or dark corners, have been brought out into well-ventilated spaces with the light needed for accurately putting away detailed records. Even if all the materials are not filed in one place, the supervisor attends to the making of the records and to their filing, so as to keep uniformity in them.

The efficiency expert, who has investigated this matter, will tell you that this costs more money for equipment, the individual salaries paid are higher, more expensive quarters are needed; but that in the face of all this, the right filing systems, properly equipped and operated, will cut down overhead expense, and give the firm the chance to do better business, perhaps even a larger volume of business, than did the old way of letting anyone and everyone attend such parts of the files as they could, when they could, and where they could.

TWO CONVENIENCE OUTLETS are better than one—

AN OUTLET FOR EVERY APPLIANCE

Construction Advances on the San Joaquin Kerckhoff Project



The dam complete. All frame work has now been removed and only water enough in the river is required to fill the reservoir.

The Kerckhoff power project of the San Joaquin Light and Power Corporation on the San Joaquin River has advanced to the point where a spring freshet can now be handled without difficulty. The first work in breaking ground was done as late as May, 1919, much of the machinery being handled and work actually commenced even before it was possible to complete an incline down into the canyon. The work has been speeded in many ways—through the installation of a rock crushing plant adjacent to the dam, extensive use of steam shovels in excavation, complete shop equipment which enabled repairs to be handled expeditiously, and a three shift system

Three shifts were worked and overtime encouraged wherever the men desired to increase their daily pay check

on the work. The dam was completed by January first. The employment of the heading and bench method in tunneling and the use of steam shovels in mucking has facilitated work on the tunnel, which had been extended some 3,000 ft. by the middle of January. Work is now progressing at the average rate of 12 ft. per day on five headings. Gates on the tunnel intake are in place and excavation is partially complete on the power house site. It is expected that the entire work will be completed and in readiness to deliver 40,000 kw. of energy to the San Joaquin system by October 1st of this year. R. C. Starr is construction engineer in charge of the work.

Intake gates on the pressure tunnel. This extends for 3½ miles through solid granite and is now about one-third complete.

The power house partially excavated. It will be cut out of the solid granite—and only a roof needed for shelter.

The Art of Conciliation

BY S. M. KENNEDY

(What is the basis of public confidence in the utility company, and how may it be won? The elements which go to make up this indispensable part of public utility service are here analyzed by the general agent of the Southern California Edison Company in the eighth article of his series.—The Editor.)

In America, when an editor rejects your manuscript, he does it either with a curt "Declined with thanks," or else sends a printed slip on which he presents his compliments, which you don't want, and regrets he cannot grant you what you want. But when an editor in a certain oriental country finds that your article or poem or story isn't worth the paper it is written on he sends you a letter like this:

"Illustrious brother of the sun and moon—Behold thy servant prostrate before thy feet. I bow to thee and beg of thy graciousness that I may speak and live. Thy honored manuscript has deigned to cast the light of its countenance upon me. With raptures I have perused it. By the bones of my ancestors, never have I encountered such wit, such pathos, such lofty thought. With fear and trembling I return the writing. Were I to publish the treasure you sent me, the Emperor would order that it should be made the standard, and that none be published except such as equaled it. Knowing literature as I do, and that it would be impossible in ten thousand years to equal what you have done, I send your writing back. Ten thousand times I crave your pardon. Behold my head is at your feet—Do what you will—Your servant's servant—The Editor."

Winning the Public's Confidence

If nothing better could be said about the foregoing letter, it must be acknowledged that the writer had some conception of the Art of Conciliation. The great trouble with so many Public Utility employes is, they apparently feel that if brusqueness and abruptness will do the work, why bother about trying to please? If some interested organization, seeking the truth, were to send broadcast throughout the land this question, "What is the greatest need of the Public Utility Company of today?" the returning answer would be, "The confidence of its patrons in particular and the public in general." There are many phases of a utility company's business which require more than ordinary attention, and many problems yet to solve, but the ever present problem is how to eliminate the lingering prejudice against such corporations. The responsible heads of companies have little difficulty in obtaining the services of competent engineers to construct and operate a property. There is not such trouble in enlisting the financial aid necessary to develop a property if it is located in a thriving territory with growing population, but there is always a difficulty for even the best intentioned corporation when it comes to the question of winning and holding the confidence and good-will of a community. The question is often asked, "Why does this unfortunate condition continue to exist?" The answer to the query points in two directions—external reasons on the one hand and internal causes on the other. It is a far cry down the centuries when we look back two thousand years, but before we analyze present conditions it might be profitable to recall some words uttered twenty centuries ago. At that time there lived in Rome a man named Cicero, one of the wisest men whose words and deeds are recorded in the annals of history. He said on one occasion, "It is difficult to tell how much men's minds are conciliated by a kind manner and gentle speech." He must have known that conciliation precedes and induces confidence. If the art existed in Rome in those early days, maybe it can be revived in this country during the present century and applied in such directions as it will do the most good.

The Origin of Distrust

Looking at the external reasons for distrust of corporations, we find that there is more than one page of earlier corporation history written over with true stories of greed, aggression and disregard of public rights. Turning from the past we find that there is more than one latter day example of short-sightedness, breach of faith and mismanagement; added to this is the ever present yellow journal, with its failing for startling headlines, inveighing against the so-called Trusts. Then there are the mouthings of the professional agitator, and the theories and vagaries of the self-appointed reform politician. We cannot deny that the yellow journal, the agitator and the politician have had some excuse for their utterances, because of the mistakes, indifference and incivility on the part of the management of some utility companies under their observation, and with whom they have had to do business.

Turning to the internal causes of public distrust, it might be well for each company through its officials to make a self-examination. Much regrettable history of corporations, which has left its mark of prejudice on the public mind, is not chargeable to any present day company, but existing companies are responsible for what goes on within their organizations. If the public today does not seem to exhibit complete confidence in all a corporation says and does, perhaps it is not the public that is most to blame.

Development of Regulation

The regulation of public utilities by State Commissions has advanced step by step during recent years, and it is inevitable that every public

A LITTLE overburdened lamp socket is a dangerous thing—

AN OUTLET FOR EVERY APPLIANCE

utility company in the United States will eventually be subject to the immediate control of some Commission responsible to the people. In the main, patrons, consumers, managers, owners and security holders of such properties have been satisfied with the results thus far achieved. Uniform rates have been established, uniform systems of accounting have been put into effect and in some directions uniform methods of operation have been made possible. Some Commissions have very broad powers, and while the distinction between regulation and management is recognized, there is always a possibility that regulation may be extended. If a State Commission has power to dictate what rates shall be charged, what shall be the quality of service and the conditions under which it shall be supplied, then why should it not control the personal treatment which shall be given customers by a public utility through its employes? Are not civility, courtesy and attention as much a part of good service as the rate charged or the voltage delivered? These questions are asked, but such minute supervision is not advocated. However, the trend of the times may bring some surprises in this direction. It would not be an improbable thing for traveling representatives of a Commission to drop into some of the public offices of utility companies, just to learn at first hand how the company treats its patrons across the counters and over the telephones, and through this agency a few company managers might be enlightened about the way their assistants are handling the public. Maybe the trend of the times is pointing to something still more radical. Is it not within the bounds of possibility that some commissions might put a premium upon records of broad public policy and the personal touch in managements, and a penalty may be imposed where a company's reputation in this regard is below a desired standard. Such premiums and penalties might be easily provided when rate fixing investigations are under way. All rates are calculated upon a basis to yield a certain net return on the capital invested. An increase of, say, one per cent above the average allowed would be a handsome premium for some companies, and a decrease of one per cent would, in some cases, be a severe penalty.

Incentives to Courtesy

Many officials of companies will say, "Oh, things are altogether different now to what they once were —the public is being well treated." For the present it may be acknowledged that there has been a great improvement in matters of this kind. Managers have sent out correctly worded circular letters with carefully prepared instructions to employes, as to how the public must be treated. If instructions given were always carried out, conditions would be ideal. But they are not. Time and again a man may be instructed to be considerate, civil and polite, but he will not unless he so desires. Unless a man has within him the desire to be conciliatory and courteous, there are only two ways to make him at least observe the forms of civility—namely, through incentive or fear. If he has ambition to progress and knows that he must follow instructions to do so, he will likely do his best. If he has the fear of losing his position for disobeying he will likely make a brave attempt to do what is wanted. If a company manager wants to really know how his patrons are dealt with, let him send a representative unknown to employes to his different offices to make such inquiries or complaints as are usually made by patrons or the public, and learn how they are treated or answered. Let the representative call up the offices on the telephone asking for information and learn what replies are given or what delays are met with. Some surprises will be in store for the manager who shows this amount of interest in his business. He will learn that he has some clerks who are wonders in diplomacy, and others who handle customers as if they were material to be "eaten up."

The Nature of Service

It too frequently happens among corporation employes that the words "serve" and "service" are not rightly understood. The utility company serves the people and consequently the company, its officers and employes are servants. Dignified service is honorable, and in no way degrading, unless the servant himself degrades it. Life is made up of service—all are servants in some respects, although perhaps masters in others. The motto on the coat of arms of the heir to the throne of England is, "I serve." The policeman on his beat, the judge on the bench and the governor in the capitol, all serve, and the President of the United States is the greatest servant of all, because he serves all the people.

If a servant in a house should become incivil, inattentive, indifferent or discourteous to his master, would the master be pleased? Would he love that servant and say that he would be delighted to help him to the utmost? No, not likely! The master would probably say to himself, "I will let that fellow go as soon as I can find someone decent to take his place." The relation between the utility company and the public is very similar. The public is the master and the company is the servant. The company exists by virtue of a franchise granted by the public. The public patronizes the company and from the public the company derives its income. The company is the servant and the public is the master. In the very nature of things, the servant must frequently ask the master for more favors—are they granted cheerfully or reluctantly? That depends upon how the servant has pleased the master. Favors asked by companies often look formidable to those who do not understand; but with communities as with individuals, conciliation may be better than logic—they may often be persuaded when they cannot be convinced.

The public is the people, but whom do the people know as the company? Not the bondholders, stockholders, or directors—not the president, secretary or manager—just the employes who transact the company's business with the public. In all truth a company is known and judged by the men it keeps; at any rate, the public knows of no other way to determine whether a company is good, bad or indifferent —no other way to tell whether a company is worthy

of confidence or entitled to distrust. If the confidence of the public is the greatest need of a public utility company, then the way to supply what is needed is to conciliate—not one department—but all through the organization; not once in a while, but all the time.

Courtesy Which Convinces

It has now become a habit to lay stress on the word "courtesy" in referring to the relations between a utility company and the public, and it is a good habit. But there are degrees of courtesy—or rather it had better be stated, there is the imitation and the real article. There is the formal courtesy of the lip and manner, and there is the courtesy that flows from the heart. The former freezes and the latter warms—the one is seldom mistaken for the other. In other words, real civility and courtesy must come from within a man and not from without. Stripped of all verbiage, genuine courtesy is the "doing unto others as you would others do unto you." But courtesy is not all that is required to obtain confidence; there must be conciliation. This word expresses a combination of the attributes which compel confidence—namely, consideration, alertness, sympathy, attention and courtesy.

The paramount question is, how to spread the gospel of conciliation among company employes so that they may be permeated with the knowledge of what the word stands for, and its importance to them and the organization of which they are a part. Connected with every up-to-date electric company, there is a New Business Department, and it is a notable fact that the experienced salesmen attached thereto do not require to have the word explained to them. To use a colloquialism, conciliation is the middle name of every successful salesman. They have learned that there can be no success in their work without courteous cheerfulness. They know that conciliation makes friends, and friends make business for the salesman. Now, if the salesman has learned how to spell conciliation, what has kept the cashier, order clerk, and other office employes dealing directly with the public so backward in their lesson? Because the cashier or order clerk is behind a counter in an office, and the customers go to him to do business, is he any better than the salesman who must go out and seek the customer? Is there any reason why an office man should adopt an air of superiority and talk to the customer impatiently, incivilly or condescendingly? There is no reason — but even today there are some office clerks so blind that they cannot or will not see the bad light in which they place the company which is paying their salaries, because of lofty indifference and careless discourtesy to the company's patrons.

Selecting Representatives

The principal points of contact between a company and the public should be guarded by employes who have been carefully selected for the position they have to fill. The manager will find that for the good of his company and its standing with the public, he cannot give too much thought to this important matter. The question of salary should not be allowed to interfere with getting good men for such work—or of keeping good men at it. Employes of the wrong stamp are dear at any price. Men who are forgetful, moody, grouchy or dyspeptic should be kept in the background and only such men as are cheerful, alert and considerate should be in the forefront in whatever place or through whatever medium the company may transact its business with its consumers and the public.

Some men are born with the natural desire to win friends by conciliation—a few men may have this quality developed in them by education, and others could never acquire it by any possible way. Most electric companies hold regular or occasional meetings of their employes, and it is suggested that at these meetings those responsible for proper public relations should give a series of "little lessons on conciliation." Employes might be called upon to demonstrate how customers should be handled under different conditions. At each meeting one department should show by actual demonstration the ideal way of pleasing the public from its standpoint. In their turn those in charge of office work, collection department, sales department, trouble department, service department, and telephone exchange should show to others in the company how the work can be done in a manner which will please and make friends. The manager should be on hand to criticize, suggest and point out the value of the right way and the injury resulting from following the wrong way. Such a program would impress employes with the absolute necessity of conciliation, and will produce good results, where circular letters of instruction would not avail.

The Extent of Conciliation

There is an attitude of conciliation which almost every man can assume if he is personally desirous of impressing another to gain a wished-for end. It expresses a desire to please which is clearly visible in the eyes, in the features, in the gestures and in the tone of voice which cannot be misunderstood. This attitude of conciliation is visible not only in personal contact, but may be traced in the wording of letters, and felt in conversations over the telephone. If a man can effectually assume this attitude in personal matters, he surely can also assume it when transacting business for the company which pays for his services. It is the part of the prudent man to conciliate the minds of others and turn them to his own advantage. It is the part of a wise man to conciliate others and turn them to the advantage of the company with which he may be connected and to whom he looks for his future advancement.

Some men think they have done their full duty towards the policy of conciliation if they "meet the customer half way." Some men go a little further and say, "Give the customer the benefit of the

WIRE IN HASTE, rewire at leisure—

AN OUTLET FOR EVERY APPLIANCE

doubt," believing that should be sufficient to please and satisfy. But no! perhaps both classes of men have stopped too soon, for in a complaint or controversy, the real attitude of conciliation assumes that "the customer is always right." Before such an attitude, complaints are forgotten, troubles vanish, and opposition fades away. The attitude of conciliation does not mean a loss of self-respect or the relinquishing of any rights. On the contrary, the implied consideration for the feelings and rights of others adds dignity to a position and costs absolutely nothing.

Representatives of a corporation, in its defense, will sometimes state that it is only an aggregation of individuals, and that the corporation should not be blamed for individual transgressions. What is the public but a greater aggregation of individuals who like their individuality recognized?

The corporation whose employes consistently practice the Art of Conciliation when coming in contact with its patrons will realize some day that, having pleased the individuals, it has finally won the much desired confidence of the public.

Essentials of Esperanto

BY W. R. DAINGERFIELD

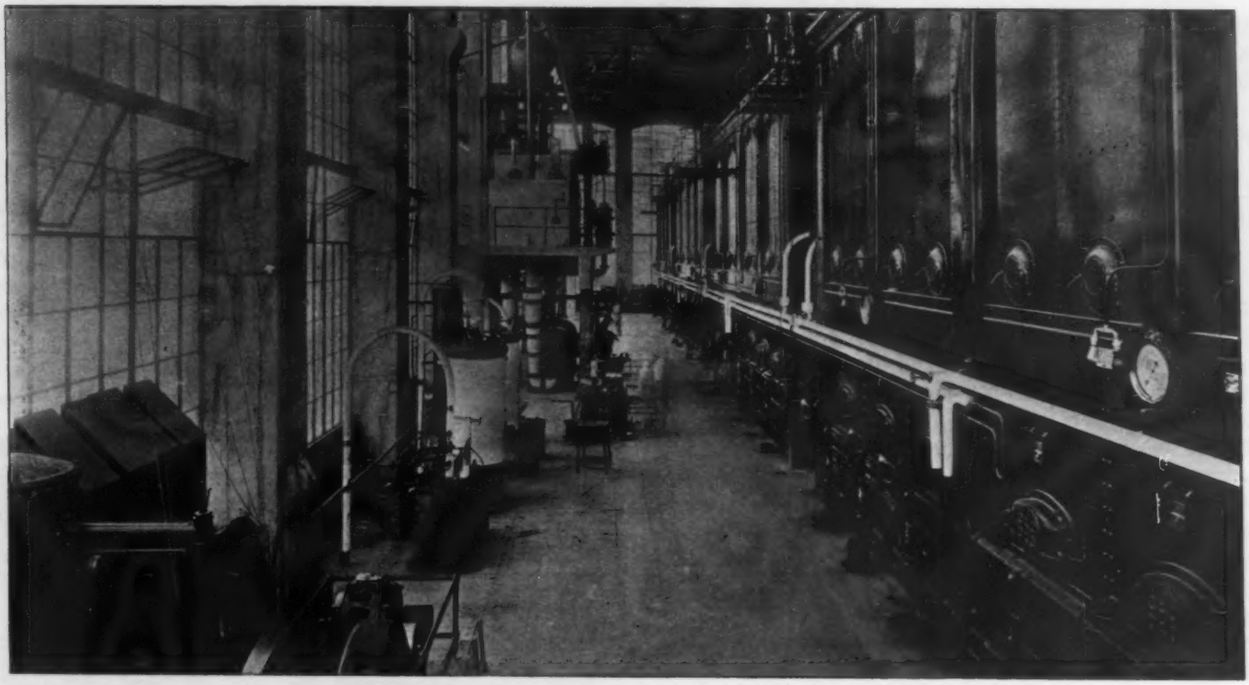
(The common commercial language is now too familiar to the readers of the Journal of Electricity to need any editorial introduction. Following is the next installment of Judge Daingerfield's brief grammar of the language.—The Editor.)

The following words from Paragraphs 23 to 40 are, for beginners, somewhat hard to pronounce:

Escepto, esst-**sep**-to; mallongaj, mahl-**lon**-gigh (the syllable "gigh" rhymes with "guy"); komponitaj, kom-po-**nee**-tigh; konstruitaj, kon-stroo-**ee**-tigh; radiko, rah-**dee**-ko; kiu, **kee**-yoo; unu, **oo**-noo (do not say **yoo**-noo); finiĝoj, fee-**nee**-joy; antaŭ, **ahn**-tow (like how, now, thou); vortoj, **vor**-toy; ankaŭ, **ahn**-kow; useblaj, ooze-**eb**-ligh (like lye); ĉirkaŭ, **cheer**-kow; prefiksoj, preh-**feeks**-oy; sufiksoj, soo-**feeks**-oy; primariaj, pree-mah-**ree**-igh; ĉiutaga, tchee-oo-**tah**-gah; vivo, **vee**-vo; grandan, **grahn**-dahn (do not say **granndann**); eŭropaj, eh'oo-**ro**-pigh (pronounce the **eŭ** as one single syllable; konformiĝante, kon-form-ee-**jahn**-teh; apostrofo, ah-poss-**tro**-fo; ĝi, jee; Zamenhof, **Zah**-men-of (notice that it is accented on the first syllable, being a personal name); Ekzercaro, Ek-zert-**sah**-ro; leglibron, legg-**lee**-bron (do not say leĝlibron, ledge-**lee**-bron, law-book); Krestomatio, Kress-to-mah-**tee**-o; lingvo, **leen**-gvo; tiu ĉi, **tee**-oo tchee; tricent, **treet**-sent; ĉia, **tchee**-ah; ducent, **doot**-sent; aligante, ah-lee-**gahn**-teh; finiĝon, fee-**nee**-jon; ŝanĝi, **shahn**-jee; vortspeco, vort-**spet**-so; kie ajn, **kee**-ay ine; logiko, lo-**ghee**-ko (do not say lo-**jee**-ko, unconsciously imitating the soft ĝ of the English word "logic"); Teodoro, Tay-o-**do**-ro; tajloro, tigh-**lo**-ro; kie, **kee**-ay; parencojn, pah-**rent**-soyn; uzus, **oo**-zoos (do not say **yoo**-zoos); necerte, net-**sehr**-tey; same, **sah**-mey; jam, yahm; plu, ploo (do not say "plew"); jen, yen; kun, koon; plejofte, play-**off**-teh; manieron, mah-nee-**err**-on; rajdi, **ry**-dee; oficiala, off-eet-see-**ahl**-ah; adjektivo, ahd-yek-**tee**-vo (do not say "jek"); ricevas, ret-**sehv**-ahs; genitiva, ghen-ee-**tee**-vah (do not say "jen"); scii, **stsee**-ee (this hard word, like others similar to it, becomes easy with the aid of a preceding vowel, thus: mi scias, meest-**see**-ahs, I know); de "scii," dehst-**see**-ee; iom, **ee**-omm; antaŭjuĝo, ahn-tow-**yoo**-jo (do not forget that we are using **ow** for the sound heard in the English words **how, now, cow**); individuigi, een-dee-vee-doo-**ee**-ghee (the g is hard); vinglaso, veen-**glahss**-o; kvanto **kvahn**-to (the tendency is to pronounce the v like a short **ŭ**, and that is permissible).

La sekvantaj vortoj el Paragrafoj 23 ĝis 40 estas iom malfacile elparoleblaj de komencantoj:

Escepto, esst-**sep**-to; mallongaj, mahl-**lon**-gigh (la silabo "gigh" ritmas kun la angla vorto "guy"); komponitaj, kom-po-**nee**-tigh; konstruitaj, kon-stroo-**ee**-tigh; radiko, rah-**dee**-ko; kiu, **kee**-yoo; unu, **oo**-noo (ne diru junu, **yoo**-noo); finiĝoj, fee-**nee**-joy; antaŭ, **ahn**-tow (kiel how, now, thou); vortoj, **vor**-toy; ankaŭ, **ahn**-kow; uzeblaj, ooze-**eb**-ligh (kiel lye); ĉirkaŭ, **cheer**-kow; prefiksoj, preh-**feeks**-oy; sufiksoj, soo-**feeks**-oy; primariaj, pree-mah-**ree**-igh; ĉiutaga, tchee-oo-**tah**-gah; vivo, **vee**-vo; grandan, **grahn**-dahn (ne diru **granndann**); eŭropaj, eh-oo-**ro**-pigh (elparolu la **eŭ**, kiel unu solan silabon); konformiĝante, kon-form-ee-**jahn**-teh; apostrofo, ah-poss-**tro**-fo; ĝi, jee; Zahmenhof, **Zah**-men-of (rimarku, ke ĝi estas vokpremata sur la unua silabo, estante persona nomo; Ekzercaro, Ek-zert-**sah**-ro; leglibron, legg-**lee**-bron (ne diru leĝlibron, ledge-**lee**-bron); Krestomatio, Kress-to-mah-**tee**-o; lingvo, **leen**-gvo; tiu ĉi, **tee**-oo tchee; tricent, **treet**-sent; ĉia, **tchee**-ah; ducent, **doot**-sent; aliigante, ah-lee-ee-**gahn**-teh; finiĝon, fee-**nee**-jon; ŝanĝi, **shahn**-jee; vortspeco, vort-**spet**-so; kie ajn, **kee**-ay ine; logiko, lo-**ghee**-ko (ne diru "loĝiko," nekonscie imitante la molan ĝ de la angla vorto "logic"); Teodoro, Tay-o-**do**-ro; tajloro, tigh-**lo**-ro; kie, **kee**-ay; parencojn, pah-**rent**-soyn; uzus, **oo**-zoos (ne diru juzus, **yoo**-zoos); necerte, net-**sehr**-tey; same, **sah**-mey; jam, yahm; plu, ploo (ne diru "plju"); jen, yen; kun, koon; plejofte, play-**off**-teh; manieron, mah-nee-**err**-on; rajdi, **ry**-dee; oficiala, off-eet-see-**ahl**-ah; adjektivo, ahd-yek-**tee**-vo (ne diru "ĝek"); ricevas, reet-**sehv**-ahs; genitiva, ghen-ee-**tee**-vah (ne diru "ĝen"); scii, **stsee**-see (tiu ĉi malfacila vorto, kiel aliaj similaj, estiĝas facile elparolebla per elparoliĝo kun helpo de vokalo antaŭiranta, jene: mi scias, meest-**see**-ahs; de "scii," dehst-**see**-ee); iom, **ee**-omm; antaŭjuĝo, ahn-tow-**yoo**-jo (ne forgesu, ke ni uzas **ow** por la sono aŭdata en la anglaj vortoj **how, now, cow**); individuigi, een-dee-vee-doo-**ee**-ghee (la ĝ estas malmola); vinglaso, veen-**glahss**-o; kvanto (oni tendencas elparoli la v kiel mallongan ŭ, kaj tio estas permesebla).



TYPICAL BOILER ROOM FOR EASY CHANGEOVER FROM OIL TO COAL

Many power plant operators prefer to so design the fuel oil operation that quick changeover to coal operation may be accomplished should oil later involve less economic operation than coal. The view shown is that of the boiler room of the steam electric plant for the lighting department of the city of Seattle—Eastlake Avenue and Nelson Place.

Changing From Coal to Oil

BY ROBERT SIBLEY AND CHAS. H. DELANY

(Fuel Oil as a possible replacement for coal in many instances continues to be a subject of great timely importance throughout the nation. Particularly is this true in New England ports and along the Gulf of Mexico, where easy access may be had by water to the petroleum fields of Mexico. California practice is proving of timely value in assisting engineers of the nation to solve the economic questions involved. Herein the authors show the fundamental calculations to be considered when weighing the respective merits of coal and oil fired steam power plant installation.—The Editor.)

When it is contemplated to change from coal firing to oil firing, the first thing to be considered is the relative cost of the two fuels. This does not mean merely the cost of a ton of coal compared to the cost of a ton of oil, because oil has a far greater heating value than an equal weight of coal. Again, while oil has a fairly uniform heating value, there are great differences in the heating values of different kinds of coal. Consequently in making the comparison it is necessary to know the kind of coal under consideration, and its heating value per pound. Even then we have not gone quite far enough, for the boiler efficiency is not the same for all grades of coal, and is higher for oil than for coal. Thus, with a good grade of semi-bituminous coal an efficiency of 75% is readily obtainable, whereas with a low grade bituminous coal or lignite it is difficult to obtain more than 60% efficiency under ordinary methods of firing. With oil, on the other hand, tests have shown net efficiencies of over 80%, and with careful operation it is readily possible to maintain 78% efficiency in regular plant operation.

Knowing the relative prices and heating values, and the probable boiler efficiency, it is a simple matter to calculate the saving that may be effected by changing from coal to oil. Suppose, for example, that the owner of a plant is purchasing coal at $6.00 per ton of 2000 lbs., and that this coal contains 6% moisture and has a heating value of 13,000 B.t.u. per pound dry. He is considering changing over to oil which he can purchase for $1.50 per barrel of 42 gallons. The oil has a gravity of 16° Be and therefore weighs 336 lbs. per barrel; it contains 1% water and its heating value when free from water is 18,500 B.t.u. per pound.

Since the coal contains 6% moisture it is 94% dry, and 1 ton of coal contains

$$2000 \times .94 \times 13000 = 24{,}440{,}000 \text{ B.t.u.}$$

Similarly, 1 barrel of oil contains

$$336 \times .99 \times 18500 = 6{,}153{,}840 \text{ B.t.u.}$$

If both fuels could be burned with the same efficiency, then by dividing 24,440,000 by 6,153,840 we would find that one ton of coal is equivalent to almost four barrels of oil. However, if the oil can be

THE COURSE of an appliance attached to a lamp socket never did run smooth—

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burned with an efficiency of 75% and the coal with an efficiency of only 69%, we find that the useful heat in one ton of coal is

$$.69 \times 24{,}440{,}000 = 16{,}863{,}600 \text{ B.t.u.}$$

and the useful heat in one barrel of oil is

$$.78 \times 6{,}153{,}840 = 4{,}800{,}000 \text{ B.t.u.}$$

Consequently one ton of coal is equivalent for steaming purposes to

$$\frac{16863600}{4800000} = 3.5 \text{ barrels of oil.}$$

The cost of 3.5 barrels of oil at $1.50 per barrel is $5.25, and since the coal costs $6.00 per ton, the saving would be $0.75 for each ton of coal. If the plant in question is a 1000-hp. plant, burning say 10,000 tons of coal per year, the saving would amount to $7,500 per year for the particular conditions assumed.

In the accompanying set of curves a comparison is shown of fuel oil with coal of heating values varying from 10,000 to 15,000 B.t.u. per lb. The heating value of the oil is taken as 18,500 B.t.u. per lb., which is a fair value for California oil, the variation from this value being small. The efficiency of 78% for oil firing assumed in these calculations, can readily be maintained in normal service provided proper attention is paid to the furnace design and the regulation of the fires. In order to make this comparison fairly correct for the different grades of coal, an efficiency of 60% has been assumed for coal having 10,000 B.t.u. and 75% for coal having 15,000 B.t.u. per lb., with intermediate values for coals that lie between these extremes. As the heating value of coal is usually given on the basis of dry coal, and as coal when purchased invariably contains a considerable proportion of moisture, it has been assumed that the coals considered in this comparison contain 6% moisture. In the case of fuel oil the water content does not usually exceed 1%, and this value has been assumed in the comparison. It will be observed from the diagram that oil at $1.50 per bbl. is equivalent in price to 14,000 B.t.u. coal at $6.00 per ton. Oil at $1.50 per bbl. is also equivalent to 12,000 B.t.u. coal at $4.60 per short ton.

In addition to the saving in cost of fuel there will always be a saving in labor on changing from

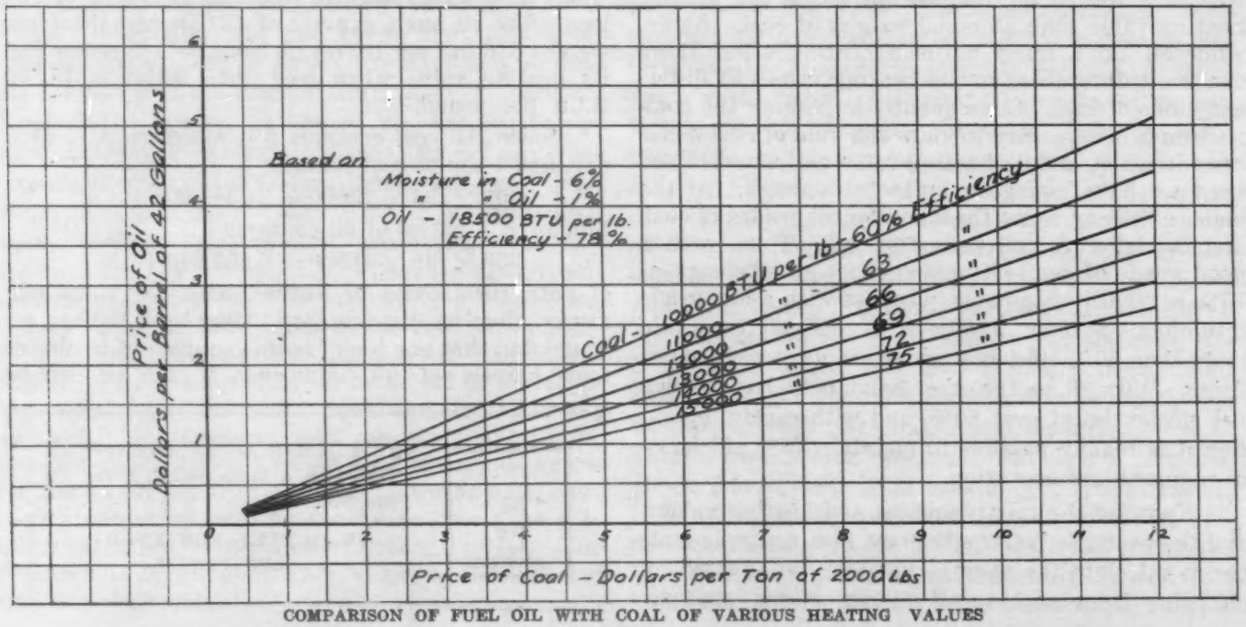
THE FURNACE INTERIOR

Here is shown the furnace interior of an oil fired boiler similar in design to the specification shown in another illustration on this page. Note the V-shaped arrangement in the brickwork in order to admit air for the economic burning of the fuel oil.

coal to oil, as the operation of firing is much simpler, there are no expensive coal elevators and conveyors to be kept up and there are no ashes to handle. On the other hand, the interest and other fixed charges on the investment required to change over, reduce the saving to some extent. Both of these items, however, are small compared to the cost of fuel, and as they tend to neutralize each other they may safely be neglected, except in special cases.

The apparatus required to change a coal burning plant into an oil burning plant consists of the oil storage tank, oil pumps, oil heater, oil burners with the necessary piping, strainers, regulating valves, etc. In addition an automatic oil firing system may be installed if desired.

The furnaces under the boilers must be altered to suit the new fuel. If the boilers are hand fired this is a simple matter, for all that is necessary is to


Price of Oil
Dollars per Barrel of 42 Gallons
Based on
Moisture in Coal - 6%
" " Oil - 1%
Oil - 18500 BTU per lb.
Efficiency - 78%
Coal - 10000 BTU per lb - 60% Efficiency
11000 " 63 "
12000 " 66 "
13000 " 69 "
14000 " 72 "
15000 " 75 "
0 1 2 3 4 5 6 7 8 9 10 11 12
Price of Coal - Dollars per Ton of 2000 Lbs

COMPARISON OF FUEL OIL WITH COAL OF VARIOUS HEATING VALUES

cover the grates with firebrick, leaving suitable openings for the admission of air, and install the burners properly housed and protected from the heat. A furnace similar to that shown in the illustration may then be used, the grates acting as supports for the checkerwork in the furnace floor. Boilers larger than 300 hp. should have a furnace length not less than 10 feet, so in many cases where the grates are shorter than this it will be necessary to extend them. For the additional length necessary pieces of pipe or I-beams may be used to support the furnace floor, instead of grates.

For stoker fired boilers the design of furnace to be adopted will depend largely on the kind of stoker, and the arrangement of coal furnace and ashpit.

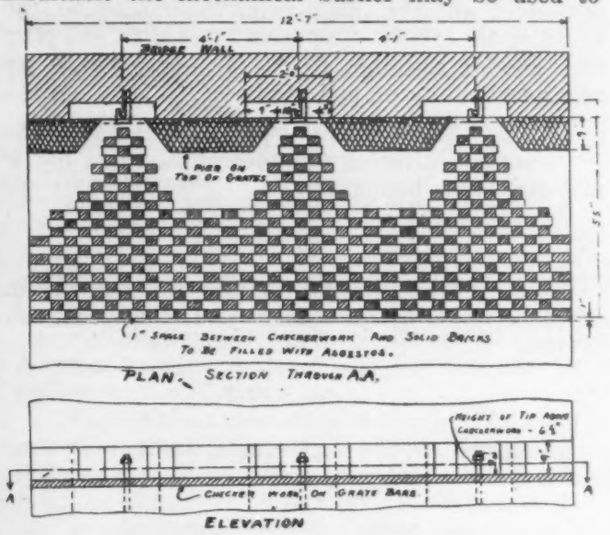
FRONT VIEW OF NEW BOILER INSTALLATION

In the view may be seen the pit and foundation setting for oil furnace in new additional installation now under way for Pacific Gas & Electric Company, San Francisco. Note the clean, trim appearance extending to the older fuel oil installation on the extreme left, which is quite characteristic of boiler rooms where oil is used as fuel.

If the use of coal is to be abandoned altogether the stokers should be removed, and an oil furnace installed of the general design indicated in the above view. If the boilers are provided with basement ash pits advantage should be taken of this to increase the furnace volume by placing the furnace floor below the level of the fireroom floor, allowing the air to come up through the ashpit from the basement.

If oil is to be used only temporarily, and it is expected at some future time to go back to coal burning, it will be possible in many cases to leave the stokers in place, placing the oil burner at the rear of the furnace, and protecting the stoker from the heat by means of firebrick supported by structural material, leaving a dead air space between the stoker and the firebrick. The practicability of this arrangement will depend on the type of stoker, kind of boiler and space available, and each case requires special study to secure the proper design.

The question whether steam atomizing or mechanical atomizing burners should be adopted will depend on local conditions. In general, it may be said that steam atomizers should be used wherever they are applicable, as they have proved their practical value by years of application to stationary work. In special cases where steam atomizers are unsuitable the mechanical burner may be used to



A TYPICAL FURNACE ARRANGEMENT

An excellent furnace arrangement for a 524-hp. boiler with standard low setting is shown above. The checker work on the grate bars indicated in shaded area represents openings 2½ by 3 in. through brickwork. The free area through the checker work is 2.44 eq. in. per hp., around the burner 0.62 sq. in. per hp., making a total free area of 3.06 sq. in. per hp.

advantage. This would include plants so located that the waste of fresh water is a serious matter. Plants in which it is necessary to force the boilers up to 300 or 400 per cent of their rated capacity may also find the mechanical atomizing burner more suitable, and this will be especially true if a steady load is carried and if the plant is already equipped with forced draft apparatus.

PUBLIC UTILITY INVESTMENTS

About $15,000,000,000 capital, representing a considerable part of all the savings of the people of the country, are invested in public utilities, according to a recent statement. The securities representing these savings are held by thousands of investors, large and small, and by nearly every bank and financial institution of the country, and in endowment funds of churches, colleges, schools, hospitals, and in other trust funds.

AN INCONVENIENT OUTLET gathers no current consumption —

AN OUTLET FOR EVERY APPLIANCE

Mass in Terms of Velocity of Electrons

BY DR. A. C. CREHORE

(Since hydrogen atoms are all alike, the author uses this simple illustration to show how the two expressions for mass of a body are equivalent—the one derived from the conception of weight and the other from the masses of the nuclei of the atoms. In other words, the interesting fact brought out in this discussion is that the mass of a body is proportional to the squares of the velocities of all electrons it contains. This is the seventh discussion this noted author has contributed to the columns of the Journal of Electricity on the subject of The New Physics.—The Editor.)

It is pointed out in this section that there are two equivalent expressions for the mass of a body of gross matter, the one derived from the conception of weight and the other from the masses of the nuclei of the atoms. The force exerted by one body upon another according to Newton's law, the masses being denoted by m_1 and m_2, is

$$F = k' m_1 m_2 r^{-2}.$$

Upon substituting the theoretical value for k' just given this becomes

$$F = \frac{1}{3} \frac{h^2}{e^2 m_o} m_1 m_2 r^{-2}.$$

A third expression for the same force was given above in terms of the speeds of the electrons, as follows:

$$F = \frac{1}{3} e^2 m_o \Sigma_1 \beta^2 \Sigma_2 \beta^2 r^{-2}.$$

Equating the last two expressions, the force is eliminated and we find

$$m_1 m_2 = \frac{e^4 m^2_o}{h^2} \Sigma_1 \beta^2 \Sigma_2 \beta^2,$$

from which evidently is obtained a general value for the mass of any body of gross matter,

$$m = \frac{e^2 m_o}{h} \Sigma \beta^2.$$

In this $\Sigma\beta^2$ is dimensionless, and e^2 has the same dimensions as h on the space-time system. Hence, the dimensions of m are the same as those of the mass of the electron, m_o, showing that the dimensions are correct. This equation tells us that the mass of a body is proportional to the sum of the squares of the velocities of all the electrons it contains, which is the same thing as the total kinetic energy of motion of all the electrons in the body.

Applying this to find the mass of a quantity of hydrogen gas consisting, say, of A atoms, it was pointed out above that the sum of beta square for one hydrogen atom is hm_H/e^2m_o. Multiplying this by A and substituting in the expression for mass just given, the e^2m_o/h cancels, and we obtain

$$m = m_H A,$$

which is evidently equal to the total mass of the gas.

Let us next look at mass from the standpoint of the masses of the atomic nuclei. If the charge of the nucleus is E, the Lorentz mass formula gives the mass of one atom as

$$m = \frac{4}{5} \frac{E^2}{c^2 ak},$$

where a is the radius of the nucleus, and m its mass. If the number of atoms in the body is A, many of the atoms being of different kinds differing in charge and in radius, the total mass of the body M, may be expressed:

$$M = \Sigma_A\, m = \frac{4}{5c^2k} \Sigma_A \frac{E^2}{a}.$$

There is good reason to suppose that we should obtain the same value for the mass of the body from this as was obtained by the above method starting with the electrons, although the summation here expressed may be difficult to realize practically in many cases. If the formula is applied to hydrogen, however, the matter is simplified because the atoms are all alike, the charge on each nucleus being 2e, and every radius being the same, namely,

$$a_H = 8/5Kk = 3.2 \frac{e^2}{m_H c^2 k} = 4.8620 \times 10^{-15} \text{ cm.}$$

Substituting these values of $E = 2e$, and a_H in the last expression for M above, it reduces to

$$M = \Sigma_A m_H = \frac{4}{5c^2k} \Sigma_A \frac{(2e)^2}{a_H} = \frac{4}{5c^2k} \times \frac{4\, m_H c^2 k\, A}{3.2} = m_H A,$$

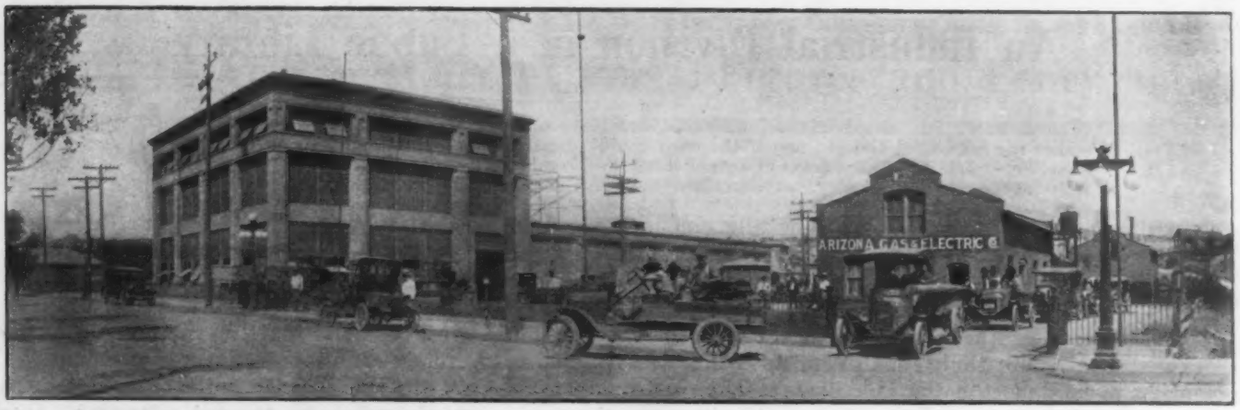
which is evidently equal to the total mass of the body of A hydrogen atoms.

We will not attempt at present to consider other atoms than that of hydrogen, that is to say, we will rest content without giving a general proof that the two different expressions for the mass of any gross body of matter are always equivalent.

ELECTRICAL AIDS TO INDUSTRY

There are but few lines of human endeavor where heat, in one form or another, is not necessary before the product is finished. The wood working establishments, for example, must have heat for the electric glue pots, the leather workers must have heat for their irons and the steel and other machinery factories must have high temperature for tempering, lacquering and japaning.

A recent canvass of the General Electric Company's Schenectady plant showed no less than 1,524 electrically heated appliances in use. A summary of this canvass shows 165 ovens, 216 furnaces for tempering, annealing, etc., 62 high current machines, 87 melting pots, 195 hot plates, 93 glue pots, 9 oil tempering baths, 13 arc type furnaces, 360 soldering irons and small hand devices and 324 small miscellaneous devices. These devices carry a total load of 12,154.5 kw. Of this load 5,341 kw. are connected to ovens and the smaller heating devices and 6,813.5 kw. to the arc type furnaces and high current machines.



A busy morning at the Arizona Gas and Electric Company. On the left the power plant, next to it the ice and cold storage plant, and farther to the right the storehouse and gas plant. In the picture are shown the various automobiles belonging to the company.

Electrical Service in a Southwestern District

(The demands made upon a power company vary widely according to the character of the district in which it is located. An up-to-date plant in the rapidly growing community described below supplies power for mining, irrigation and refrigeration as well as for all the usual lighting and industrial purposes.—The Editor.)

The town of Nogales, in Arizona, is the center of an extremely rich agricultural, mining and cattle raising district. It has a large import and export business, and is the gateway to the whole surrounding country in Arizona and the wonderfully rich west-coast section of Mexico. In this section agriculture is dependent upon irrigation, which is accomplished by pumping from shallow wells. The supply of water from this source seems unlimited.

Nogales is also the center point of supply for a large and active mining section. The surrounding district is very highly mineralized. A number of old and valuable mines are in operation, and many new developments are being made at this time.

The plant of the Arizona Gas and Electric Company at Nogales has been in operation about three years, and furnishes electric light and power, gas and ice to the town of Nogales, Arizona, the mining district in Patagonia Mountains in Santa Cruz county, the irrigation district of the Santa Cruz river and to the city of Nogales, Sonora, Mexico,—in all a population of over 12,000.

The company has a modern gas plant, manufacturing gas from crude oil by the Lowe process, with a daily capacity of 72,000 feet. The electric power plant and ice plant are housed in a light colored brick building, 168 feet by 58 feet and 40 feet high, with steel and concrete roof and concrete floors making it absolutely fire-proof. The walls between pilasters are almost entirely of ribbed glass set in steel frames, making an exceptionally light operating room.

The power plant consists of McIntosh and Seymour Diesel oil engines, direct connected to General Electric generators, the capacity of each unit being 500 horsepower. These Diesel oil engines burn crude oil of the cheapest grade and the economy is high. The present cost of fuel per kilowatt-hour is approximately five mills. A complete equipment for receiving, storing, pumping and delivering oil from tank cars has been provided. The storage capacity is about 50,000 gallons. The entire plant represents the latest and best practice in power plant design and construction. The property is located on Grand Avenue, Nogales, Arizona, near the business center and on a railroad siding.

The ice plant consists of a fifty-ton York ammonia compressor driven by a 100-hp. electric motor, and has a daily output of thirty tons of ice. There is an ice storage room for seven hundred tons of ice and a cold storage department of five rooms with 20,000 cubic feet of storage capacity. The company has a tunnel to the railroad siding with electric conveyors and hoists, with double platforms for icing refrigerator cars and for loading ice cars.

The electric distribution system covers the entire town of Nogales and adjacent territory. Its high tension transmission line of 23,000 volts extends over the Patagonia mining district for a distance of about thirty miles. The company has also extended its lines north of Nogales about four miles and entered the irrigation district, where a large demand for power for pumping is expected.

The entire property of the company is practically new and all is of the most modern and efficient type, and no expense is spared to maintain every department at the highest point of efficiency possible.

The towns on both sides of the border are growing rapidly and especially is this true of Nogales, Arizona. The number of customers for gas, electric light and power increases at a rate that taxes the service department to the utmost to keep pace with the demand.

ONE LAMP SOCKET cannot make an electrical home—

AN OUTLET FOR EVERY APPLIANCE

An Industrial Division in a Public Library

BY ARTHUR R. BLESSING

(The demand for industrial and scientific books, pamphlets, trade catalogs and periodicals, makes the industrial division one of the most useful departments of the modern public library. Excellent work has been done in establishing and conducting a department of this sort in the Washington Public Library, as described here by the assistant librarian.—The Editor.)

Although Washington is not generally considered an industrial city, an approximation reveals the fact that there are over 500 manufacturing establishments now in operation in the District of Columbia. The needs of these manufacturers and their workmen, the many thousands of professional and scientific men, and the varied business interests demanded an industrial division of the public library.

This demand had been potential for several years, but it was not until 1907 that a separate industrial division could be established to meet the need. In general the plan followed was similar to that of Newark and Providence, where successful industrial divisions were already in operation. The usual amount of newspaper and other publicity was used to announce the opening, and from its inception on the first of November, 1907, the industrial division has proved a complete success.

The most important single group of books consisted originally of engineering sciences in all their various phases, and in both theoretical and applied branches. The aim was to have as complete a representation as possible but not a surplus of any subject not in active demand. Three other important subjects were business and finance, agriculture and domestic science. Pure science was also well represented. Architectural works, drawing, and other fine arts subjects were originally included, but were withdrawn during the war to make way for the flood of material dealing with technical and engineering aspects of the war.

Probably the periodicals constitute the most important part of our collection for current topic use, and of these we have about two hundred, a few of which are kept bound for permanent use on account of their reference value. All books and periodicals used in the industrial division are ordered through our order division and records of their accession, time of arrival and all correspondence concerning them are kept in this division.

As Washington is the center of so many activities, we are constantly in receipt of a multitude of pamphlets, booklets, etc., most of which are of considerable value to us. In exceptional cases, this material is accessioned, cataloged and bound, but the greater part is simply put in manilla envelopes and filed in vertical files. This constitutes what we call our pamphlet collection and is of the utmost value to our readers and ourselves. Subjects are used that correspond in the main to those in our regular catalog and all of our pamphlets are filed alphabetically by subject. These subjects are so subdivided and easily applied to the material in hand that no separate index is needed.

Government documents are used to a considerable extent and as Washington is the home of documents, we are freely supplied. The documents from the Department of Agriculture and the Bureau of Foreign and Domestic Commerce are especially valuable to us. Foreign trade, which is a very live subject with us, is amply fortified with many excellent government treatises and texts on manners and customs, needs, etc., of nearly all foreign countries. Farmers' bulletins are likewise in heavy demand and these are bound for our permanent collection. Our documents, and in fact all parts of our collection, are subject to constant weeding out so as to eliminate dead wood and keep the resources of the division in a live and healthy state.

The trade catalog collection, which has grown to comprise over 6,000 separate catalogs, is one of our prize assets and its use is enormous. Its field is unlimited and we are constantly adding new ones as well as withdrawing those that are obsolete. This collection is thoroughly indexed and cross indexed. A separate card is made for each subject and thereon are listed all firms whose catalogs we have at the time. A second index is made by firm so that we can tell at a glance whether or not a certain firm is represented. All small catalogs are put into manilla envelopes and are filed right in with large ones of the book type, while the whole scheme is to file alphabetically by subject.

Our rules for lending are very liberal and allow almost unlimited use of all resources for a month if necessary. Not only books are circulated but back numbers of periodicals, pamphlets, trade catalogs and duplicate government documents. At times attempts have been made to circularize various groups of people who should be more fully acquainted with our resources, and these attempts have been successful to a considerable degree. We advertise new books for the industrial division each month by a list in a leading Sunday paper and a reprint of this list in our monthly bulletin.

During the war the use of war books of all descriptions increased a great deal, and in engineering and chemical research work, the industrial division rendered valuable assistance to many officers of both the army and navy. Now that the war is over, men interested in business and trade, particularly foreign trade, are making much use of this division. Not only business men but their clerks and those from the government departments spend much time here using our books on stenography, bookkeeping, accounting, and mathematics.

Our clientele is a little different from the average in that the professional and scientific men are in evidence. This may be accounted for somewhat by the fact that our borrowers number hundreds of students from Washington's many schools and colleges. Engineering of all kinds has always been our strong point, but the business field is fast becoming a close rival for our endeavors.

SPARKS—Current Facts, Figures and Fancy

(Electrical aids to blushing vie with electricalmoth-massacre for popular interest in this group of miscellanea. For the commercially-minded inspiring figures are provided regarding Western business activity, as well as an account of two recent interesting inventions.—The Editor.)

The state of Oregon produced 10 per cent of the platinum used by the United States during the war.

* * *

Diesel oil engines removed from German submarines are being purchased in England for use in electricity works.

* * *

The total contracts for building operations in San Francisco for the year 1919 amounted to $18,644,343, an increase of $9,456,135 over 1918.

* * *

There were 12,330 miles of wire added to the telephone exchange plants in New Zealand during the fiscal year ended March 31, 1918, and 13 new exchanges opened with additional accommodation added in 28 others; additional exchange connections for the year amounted to 4,940.

* * *

A recent report records the "progress made in fish rescue work on the upper Mississippi River" and states that up to September 20th "approximately 68,000,000 fish were rescued." No doubt we ought to know what fish-rescue work is, but somehow we find ourselves confusedly wondering whether it is a first-aid or a missionary activity.

* * *

Permanent blushes, acquired by means of electrical tattooing, are now becoming popular among European women, according to a recent report. The outfit comprises an electric tattooing needle operated from a battery and supplied with current through a flexible wire, while a small hollow chamber in the base of the needle contains the coloring matter.

* * *

Moth mangling by electricity sounds like an unnecessarily savage pastime until we learn that it is a method employed by walnut growers to destroy the moth cocoons and larvæ in the walnut sacks. The codling moth has been known to spoil as much as 40% of a walnut crop, and it was necessary to go to large expense in order to pick out the infected nuts. The electric mangling methods, by treating the sack to a pressure of two hundred pounds and a temperature of 700 degrees at the same time effectively destroys the larvæ which are accustomed to spend the winter in the sacks.

* * *

A small hydroelectric plant in the Italian Alps operates under an 8,000-ft. head—the highest head of any hydroelectric plant in the world. Several small plants in Switzerland have heads of over 3,000 ft., and one as large as 3,000 kw. operates under a head of 5,400 ft. Of large plants, the present record is held by a plant in Norway with a 2,400-ft. head, but this record is to be broken by two plants in the Kings River project of the San Joaquin Light & Power Corporation, which will involve 60,000 kw. each, both to operate under 2,500-ft. heads.

* * *

A recent house-finishing development is a motor-driven stucco machine by which the material is applied by projecting it from the machine by centrifugal force set up by revolving spider blades. The manufacturers of this device state that by applying the stucco in this manner, a skin, or enamel, is formed, making an outside coating which is impervious to moisture.

* * *

An English engineer has recently invented a machine which he claims will bore circular tunnels through the hardest rock, by means of specially constructed hammer tools actuated by "Sonic waves." These waves are able to give the exact force and rapidity to the abraders which is required and which is obtainable by no other means. The abraders will be placed on five rotating arms driven by a Sonic motor. The abrading tools will strike the face of the rock at the rate of 3,000 blows per minute, each blow having a weight of 1,120 lb. By this means the whole face of the rock is abraded by each arm to a depth of $\frac{3}{8}$ in.; thus with the five arms $1\frac{7}{8}$ in. will be excavated at each revolution. The Sonic generators are driven by electric motors.

* * *

It will take more than prohibition to put California out of business, judging by the following figures. In 1918, while wine and brandy sold in California amounted to $16,000,000, the other industries lined up as follows: Petroleum sold for $127,000,000, or approximately eight times the wine crop. California's hay sold for $62,000,000, or about four times what the wine brought. The grain crop was sold for $67,000,000; deciduous fruits (except apples) for $40,000,000; canned fruits and vegetables for $71,000,000; dried fruits and raisins for $41,000,000; citrus fruits for $47,000,000; beet sugar for $19,000,000; gold for $17,000,000; beans for $35,000,000; potatoes for $17,000,000; borax, salt, etc., for $12,000,000; copper for $12,000,000; nuts for $12,000,000; cement for $6,000,000; crushed rock for $3,000,000; fresh apples for $7,000,000.

SPARE the wiring expense and spoil the home—

AN OUTLET FOR EVERY APPLIANCE

PERSONALS

O. B. Coldwell, superintendent of the Portland Railway, Light & Power Company, has been promoted to the position of the second vice-president of that company. Mr. Coldwell has been known to the electrical industry throughout the West as one of its most earnest and helpful workers. A graduate of Stanford and Cornell Universities, and an engineer of unusual merit, his rise with the Portland Railway, Light & Power Company has been rapid. Mr. Coldwell was one of the first presidents of the Northwestern Electric Light and Power Association, and has for many years served as chairman of the executive committee of that association, and at the present time he is engaged as chairman of a special committee in the promotion of a special train from the Northwest to attend the convention of the National Electric Light Association at Pasadena, May 18th to 21st, 1920. Strength to his strong right arm!

John Barton Payne, chairman of the Shipping Board, has been appointed by President Wilson to succeed Franklin K. Lane as Secretary of the Interior. This announcement was made the day after the first forms of the Journal of Electricity had gone to press, with the result that in an editorial appearing earlier in this issue, the appointment is discussed as an open subject.

Howard Fearey of the Pacific States Electric Company, Portland, with Mrs. Fearey visited in Seattle recently.

L. Bartlett, engineer for Henry L. Doherty and Company, is among recent Eastern visitors to San Francisco.

J. S. Groo of Portland, Oregon, has become sales manager of the Northwestern Electric Company, succeeding George G. Bowen.

R. C. Chamberlain, Northwest manager Hurley Machine Company, has returned to Seattle from a month's visit to the factory in Chicago.

Professor B. F. Raber, of the mechanical engineering department of the University of California, has been granted a leave of absence.

F. I. Fuller has been appointed first vice-president of the Portland Railway, Light & Power Company, in charge of railway operation.

C. O. Martin, representing the Benjamin Electric Company, Seattle, has returned to that city after spending some time on business in Portland.

D. C. Henny, consulting engineer of Portland, recently passed through San Francisco on his way back from a meeting of the A. S. C. E. in New York.

Howard E. Davis has been appointed as service secretary for the American Association of Engineers, with offices at 407 Hilford Building, Portland, Oregon.

E. A. West, chief engineer and general superintendent of the Denver Tramways Company, has returned to Denver after spending some time in San Francisco.

B. C. Condit, formerly chief engineer of the Northwestern Electric Company, is now with the Great Western Power Company with headquarters in San Francisco.

Miles F. Steele, Pacific Coast manager, Benjamin Electric Manufacturing Company, has recently returned to San Francisco from an extended trip to Southern California.

Willis M. Deming, Pacific Coast general manager for the McGraw-Hill Company, owners of the Journal of Electricity, will return from a visit to the East about February 25th.

F. M. Kerr, vice-president and general manager of The Montana Power Company and chairman of the Steam Railway Electrification Committee of the N. E. L. A. is a California visitor.

A. W. Ransome, from the Boston office of the Blaw-Knox Company, has been appointed Western district manager for the company with headquarters at 754 Monadnock Building, San Francisco.

Pun Ai Do and **Chi Chin Yin,** leading Chinese merchants, arrived in San Francisco recently from Peking as delegates to the Foreign Trade Convention which will be held in San Francisco in May.

F. D. Weber, electrical engineer for the Oregon Insurance Rating Bureau, has been appointed on the Electrical Hazard Committee of the National Safety Council of Oregon and the Columbia Basin Division.

Charles S. Older and **Ralph A. Green,** both connected with Mt. Whitney Power & Electric Company for a number of years, have formed a partnership and will engage in the electrical contracting business in Hanford.

Alexander Taylor, for many years manager of works for the Westinghouse Electric & Manufacturing Company, has been made assistant to vice-president in general charge in all plants of production, stocks and stores.

R. V. Orbison, for many years city engineer in Pasadena, has been appointed city manager for the city of South Pasadena. No announcement has been made as to who will succeed Mr. Orbison as city engineer for Pasadena.

J. D. Barnhill of Evans & Barnhill, merchandising-advertising, with headquarters in New York City, is a recent Pacific Coast visitor. Mr. Barnhill is advertising agent for Habirshaw Electric Cable Co., Inc., and other large manufacturers of electrical supplies.

Frank S. Hamilton has been appointed agent for the Mt. Whitney Power & Electric Company at Hanford. Mr. Hamilton has been with the company for fourteen years, having started as a helper in the meter department. For the last two years he has been power salesman in the Tulare district.

R. M. Alvord, local supply manager of the General Electric Company, with headquarters at San Francisco, has left for eastern cities, where he goes in the interest of the Pacific Coast Section, N. E. L. A. The particular plan Mr. Alvord has in view is the calling upon prominent manufacturers in the East to assist in spreading the helpful message of greater usage of the convenience outlet in the home, in order to make way for more expansive uses of electricity in the home. The entire problem is set forth most completely elsewhere in this issue in the paper by Garnett Young, which is made to the Commercial Section of the Pacific Coast Section, N. E. L. A. Mr. Alvord has proved himself an able analyzer, and one of the best types of helpful associates in forwarding the good work of the California Electrical Cooperative Campaign, upon the advisory committee of which he serves as a member.

M. H. Aylesworth, who has recently been appointed assistant to the president of the National Electric Light Association with headquarters in New York City, comes to his new office with unusual qualifications for utility service. Mr. Aylesworth was for years connected with the Public Service Commission of Colorado as its chairman, and later went to Salt Lake City where he was connected with rate matters for the Utah Power and Light Company. In his present capacity Mr. Aylesworth is executive head of the national headquarters in the absence of President Ballard. The employment of such splendid talent as Mr. Aylesworth in affairs of the Association has added strength and renewed confidence in its activities throughout the nation.

Bruce Whitney of Walla Walla, Wash., has been appointed by the public service commission to supervise the work of taking a census of all public utilities in Washington.

R. C. W. Libbey of the Simplex Company has been made Western sales manager of the company, with headquarters with the firm of Holbrook, Merrill & Stetson in San Francisco, who are Western agents for the company.

William T. Poulterer, who for a number of years has held the position of engineer with the Philadelphia Electric Company Supply Department, Philadelphia, Pa., has resigned and accepted the position of engineer of the Electrical Development & Machine Company, of Philadelphia.

E. C. Jones has resigned his position as chief gas engineer of the Pacific Gas & Electric Company. Mr. Jones was a pioneer in the development of the gas industry on the Pacific Coast, and the retirement of so able a worker from public utility life is much regretted by his many friends and co-workers.

W. J. Stanton has accepted a position with The Ohio Brass Company. Mr. Stanton has been identified with the electrical industry for the last twenty years, having started with the General Electric Company and remaining with them for a period of eighteen years in the testing, engineering and sales departments.

R. W. Shepherd, former auditor for the Portland Railway, Light & Power Company, has been elected general auditor and assistant treasurer. **A. J. Johnstone** has been promoted from assistant auditor to the position of auditor. **C. M. Huggins,** treasurer, has resigned to accept a position with a lumber company.

J. G. Miles has been appointed to the position of supply division manager of the Seattle office of the Westinghouse Electric and Manufacturing Company, succeeding **C. V. Aspinwall** who has been transferred to Spokane. Mr. Miles has for several years been head of the company's insulation section at East Pittsburgh, Pa.

R. R. Walbridge has been appointed agent for the Mt. Whitney Power & Electric Company at Porterville, taking the place of **A. I. Whitehead,** who has been transferred to the position of district agent for the Southern California Edison Company at Alhambra. **W. P. Graef,** district agent at Alhambra, has been transferred to a similar position at Long Beach.

S. J. Lisberger, engineer of San Francisco district, Pacific Gas & Electric Company, has just returned from a very extended tour of Eastern states after attending a meeting of the apparatus committee of the N. E. L. A. Mr. Lisberger brings back to the Pacific Coast many ideas of the future trend of the development of electrical apparatus.

Thomas A. Edison, whose seventy-third birthday was celebrated on February 10th, was recently honored by the electrical men of the Pacific Coast at a joint meeting of the Rotary Club of San Francisco and the San Francisco Electrical Development League, when a telegram of congratulation was sent to the eminent inventor.

A. L. Rohrer, electrical superintendent of the Schenectady Works of the General Electric Company, has passed through San Francisco on his way to the Orient. Mr. Rohrer is accompanied by Miss Miriam Rohrer, his daughter, both of whom expect to spend some time in the far east in travel and in recuperation from the shock occasioned by the recent death of Mrs. Rohrer.

Franklin K. Lane, Secretary of the Interior, has resigned the post which he has held since the beginning of President Wilson's administration. Prior to that he was chairman of the Interstate Commerce Commission. Announcement has been made that Mr. Lane will be associated in an executive capacity with the Mexican Petroleum Company, the Doherty interests.

F. M. Feiker, editorial director of Journal of Electricity, Electrical World, and Electrical Merchandising, has been elected vice-president of the McGraw-Hill Company, and chairman of the Board of Editors of its eleven journals. Men of the electrical industry in the West will hear of this new appointment with unusual interest, for during the past summer, at the time the Journal of Electricity was being taken over by the McGraw-Hill Company, Mr. Feiker spent some time on the Pacific Coast and made many friends. One of Mr. Feiker's methods of getting first-hand information is to go himself into the problem with a thoroughness of detail that is possessed by few men. During his sojourn on the Pacific Coast last summer he went over the new work of the San Joaquin Light & Power Corporation, and the view shows Mr. Feiker with **I. W. Alexander,** of the commercial department, and **R. C. Starr,** chief engineer of construction, preparing to board the tram to be let down into the gorge where the great Kerckhoff Dam is under construction. Mr. Feiker is an electrical engineer of national prominence and his position as head of the editorial staff of the McGraw-Hill Company augurs much for the continued emphasis of electrical development on an international scale throughout the technical press of the nation.

Left to right: F. M. Feiker, I. W. Alexander, R. C. Starr

WHAT IS SCREWED into a lamp socket must be screwed out again —

AN OUTLET FOR EVERY APPLIANCE

H. T. Cory has been given a leave of absence from the United States Department of the Interior to become chairman of a commission of three engineers, one American, one English and one French, to report on the complete utilization of the waters of the Nile River in Egypt for irrigation purposes. This commission is known as the Engineering Commission of the Reclamation Service Department of the Egyptian Government. Mr. Cory sailed for Cairo, Egypt, on January 21, 1920. It will be recalled that Mr. Cory had a large and substantial part in the reclamation of the Great Salton Sea disaster in Southern California some years back, and engineers in the West will take unusual interest in noting this new and interesting investigation in which he is engaged.

D. S. Kimball, dean of engineering of Cornell University, was the guest of the Engineers' Club of San Francisco on February 5, 1920. During the same week he also spoke at the University of California and at Stanford University. On his Western tour Mr. Kimball has been welcomed from one end of the West to the other, and has appeared before many universities, engineering faculties, and other organizations interested in the welfare of the professional engineer.

Milton Kraemer, a consulting engineer of San Francisco, has left for New York, from which city he expects to leave shortly for European ports. Mr. Kraemer goes abroad at the invitation of certain capitalists in New York City to study combustion problems in Belgium. During his work in San Francisco he has been engaged in the study of combustion problems for the Great Western Power Company and other of our larger central stations of the West. Mr. Kraemer plans to return to San Francisco in about three months.

Frank S. Easton has been appointed Chief Civil Engineer of the Mexican Light & Power Company, Mexican Tramways Company and their various subsidiary corporations in the Republic of Mexico. Mr. Easton was for many years hydraulic engineer for the British Columbia Electric Railway Company, Ltd., having charge of the design and construction of a number of important hydroelectric plants both on Vancouver Island and the mainland. He reports to **G. R. G. Conway,** Chief Engineer of the Mexican companies, under whom Mr. Easton served when he was Chief Engineer of the British Columbia Electric Railway Company, Ltd.

H. H. Wadsworth, who has been with the corps of engineers, U. S. A., since 1897 and since 1905 chief assistant engineer of the California Debris Commission, has severed his connection with the commission and has opened an office in San Francisco for consulting and general engineering practice, specializing on works for the utilization of water and for flood protection. During the war Mr. Wadsworth held the rank of major. For two and one-half years he was connected with the advisory board of engineers appointed by the President to advise the Secretary of the Interior on San Francisco's plans for developing a source of water supply.

H. N. Sessions, of the Southern California Edison Company, chairman of the membership committee of the Pacific Coast Section, N. E. L. A., advises that his committee has already secured three hundred new members and has just started. He modestly ascribes a large part of the credit for this showing to **E. G. Snow** of the Pacific States Electric Company at Los Angeles, and **R. I. Carruthers** of the Mt. Whitney Power & Electric Company at Visalia. As ninety per cent of these new members have been secured from Southern California, Mr. Sessions estimates that the North will have to get busy if they are not to be outclassed by the South.

Max Thelen, formerly president of the California Railroad Commission, has been appointed on the Liquidation Board which is to handle the return of the railroads to private ownership. Mr. Thelen is recognized, from his constructive work on the California Commission, as well as his recent work in the national field, as one of the foremost authorities on public utility policy in the country.

W. D. Moore, in charge of maintenance and construction work for the Pacific Telephone and Telegraph Company at Portland, will go to Seattle as head of the plant department. **H. J. Tinkham** of Spokane will be transferred to Portland to take his place. **C. B. Allsop,** recently transferred from San Francisco to Portland, will remain in charge of traffic operations in Oregon under the title of division superintendent of traffic.

William S. Turner, consulting civil and electrical engineer of Portland, Oregon, has recently returned from an extended trip throughout the East. His work in the East included valuation reports on various Pacific Coast properties, an effort to interest New York capital in developing a large hydroelectric power proposition in which he is interested, and a study of the electric railroad situation, especially as regards rates, franchises and motor bus competition.

OBITUARY

A. C. Hansen, city engineer of Los Angeles, died February 9th from influenza.

David S. Collins of the Celite Products Company, in New York, died on January 15th.

N. E. L. A. NOTES

Manufacturers Appointed on Committee —

The National Electric Light Association has for the first time gone outside the electric light and power field for members of one of its major committees. The executive committee of the association has confirmed the president's appointment of Guy E. Tripp, chairman of the board, Westinghouse Electric & Manufacturing Company, and O. D. Young, vice-president, General Electric Company, as members of the public policy committee.

John A. Britton, chairman of the public policy committee, said, "There is a relationship in the industry that makes manufacturers as essential to the success of the organization as operators." Mr. Britton urged the acceptance of these appointments because of the good it will do the entire industry.

New Headquarters Organization —

In order to strengthen Association activities by making individuals responsible for certain work, the executive committee of the National Electric Light Association, on recommendation of the president, has resolved to departmentalize the work at headquarters and to reorganize executive control through the executive committee in such a way as to give all parts of the country representation in direct proportion to the volume of business done.

M. H. Aylesworth, whose title has been changed from executive assistant to the president, to executive manager of the association, has prepared a full report on this subject which is now being studied by a committee appointed for the purpose. Such a plan will involve certain expenditures, and so this committee, and Treasurer H. C. Abell, in conjunction with the finance committee, is studying plans for financing the activities. The new plan will not be effective until July 1, subject to the approval of the Pasadena convention in May.

Under the plan it is proposed first to add a department of engineering and one to handle publicity, to the three existing departments of committee service, company service, and finance and accounting.

Meeting Notices for Electrical Men

(A feature of electrical activities during the past week was the phenomenally large gathering of the San Francisco Electrical Development League and the Rotary Club. The Northwest district also reports interesting meetings both of engineers and contractor-dealer associations.—The Editor.)

Joint Meeting of San Francisco Electrical Development League and the Rotary Club

The joint luncheon meeting of the San Francisco Electrical Development League and the Rotary Club of San Francisco, held in the ball room of the Palace Hotel on February 10th, was an occasion of great importance to the electrical industry. "Do It Electrically" was the illuminated legend displayed at the speakers' table, and the whole trend of the day's program was to show the great facts of electrical enterprise in the West. The exposition of modern power development presented by Robert Sibley, editor of the Journal of Electricity and Western editor of Electrical World and Electrical Merchandising, was listened to with great attention by the 500 business men present, and the result of the enthusiasm inspired among them thereby is bound to be profitable to the entire industry.

Thomas Doane, president of the Rotary Club, in calling the meeting to order, heartily welcomed the members of the Development League as representatives of a truly vital factor in modern life. The usual good fellowship of the Rotarians was displayed in the announcements and the introductions of guests. Secretary E. H. Feighner read telegrams from Rotarians W. M. Deming and R. M. Alvord, now in the East, congratulating the organization on its observance of Electrical Day.

D. E. Harris, vice-president and sales manager of the Pacific States Electric Company, was introduced as chairman of the day. He inaugurated proceedings by inducing all who were members of both Rotary Club and Electrical Development League to arise, then penalizing them for their prominence by levying fines with a heavy hand. Paul M. Downing and H. F. Jackson, new vice-presidents of the Pacific Gas & Electric Company, were introduced and promptly fined. A telegram of congratulation was sent by the gathering to Thomas A. Edison, in observance of his seventy-third birthday.

Pointing out the importance of a knowledge of the electrical industry to all business men, Mr. Harris presented Robert Sibley, the speaker of the day. Editor Sibley gave a comprehensive survey of the accomplishments of the West in electrical development, supplementing his remarks with illustrations and graphic charts thrown upon the screen. The many "world records" held by the West in electrical engineering were emphasized. Typical of these features was the table showing the fact that the "power pool" formed during the war by the power administrator of California constituted the greatest combined system in the country:

Pacific Gas & Electric Company, Great Western Power Company, Sierra & San Francisco Power Company	**1,500,408,765**
Commonwealth Edison Company	1,488,080,000
Niagara Falls Power Company	1,188,221,770
Ontario Power Co. & United Electric Light & Power Co.	954,913,584
Montana Power Company	**947,732,014**
Montreal Light, Heat & Power Company	946,832,817
Hydraulic Power Company	871,563,138
Toronto Power Company	800,638,000
Southern California Edison Company	**794,687,405**

Information little known to the average businessman—such as the fact, for instance, that the West, with 8 per cent of the country's population, utilizes 20 per cent of the electrical energy generated in the nation—was presented in a forceful manner, accentuating the importance of electrical development to the community as a whole.

The enthusiastic applause of the audience when Mr. Sibley had concluded his address indicated the intense interest which had been aroused in these representative men of San Francisco by presentation of the achievements of the electrical industry in the West.

BUILDERS OF THE WEST — LXXI

W. D'A. RYAN

The brilliant and enduring effects of the illumination at the Panama-Pacific International Exposition in 1915 brought out a certain beauty, transformation and efficiency that have established new records in the art of illumination. Since that period, these same principles made use of in San Francisco in 1915, have been utilized in the lighting of three of our great western cities, Los Angeles, San Francisco and Salt Lake City. To W. D'A. Ryan, illuminating engineer of the General Electric Company, this issue of the Journal of Electricity is agectionately dedicated as a lasting memorial to his genius, displayed in so advancing the art of illumination that the West today is looked to as the model after which the other great districts of the world should pattern.

San Francisco Electrical Development League

"California Electrical Cooperative Campaign Day" at the League was held on Monday, January 26th, and consisted of a most complete review of the activities of the Campaign and its plans for the future. Lee H. Newbert, chairman of the Advisory Committee of the Electrical Cooperative Campaign, acted as chairman of the day, and in the course of his remarks presented the viewpoint of the power companies on the results of the movement. D. E. Harris spoke on "The Jobbers' Viewpoint," while R. M. Alvord gave the attitude of the manufacturers, and C. L. Chamblin that of the contractor-dealers. H. W. Angus, secretary of the California Electrical Cooperative Campaign, presented an advance summary of the Advisory Committee's yearly report. Particular attention was drawn to the cooperative advertising sections and pages, a display of the best examples being made. A number of prominent advertising men of San Francisco were present as guests.

On February 2nd, the members of the Electrical Development League were inspired by a talk on "Americanization,"

WHILE THERE IS LIGHT there is no room for electric appliances on the lamp socket—

AN OUTLET FOR EVERY APPLIANCE

by John J. Arnold, supervisor of the International Business Department, Bank of Italy. G. I. Kinney, of the International General Electric Company, acted as chairman of the day. At this meeting, amendments to the constitution were unanimously carried lengthening the term of officers of the League to one year. These amendments were printed in the Journal of Electricity of February 1st.

Oregon Association of Electrical Contractors and Dealers

The regular meeting of the first district, Oregon Association of Electrical Contractors and Dealers, was held Monday, January 26, 1920, at the Chamber of Commerce. The meeting was called to order by Chairman Bauman at 7:30. The following firms were represented:

F. A. Bauman Electric Co.
J. F. Barrett
R. W. Larsen
Pierce-Tomlinson Co.
Scott Electric Co.
Jaggar-Sroufe Co.
Morrison Electric Co.
Vanderlip & Lord

Mr. Pierce, chairman of the Code Committee, reported progress in the revision of the Code. Mr. Sroufe's motion that a committee be appointed to appear before the city council to urge the adoption of the National Underwriters' Code, with the addition of the necessary administrative clauses, was not favorably considered.

Mr. Barrett, chairman of the Retail Section, suggested a series of lectures on illumination to be held during meetings devoted to the retail section. On motion of Mr. Tobey, the suggestion of Mr. Barrett, with amendment offered by Mr. Tomlinson to the effect that foremen and salespeople from the different firms be invited to attend, was approved, and Mr. Barrett authorized to proceed with the arrangements.

At the regular meeting February 2nd, the following firms were represented:

J. F. Barrett
F. A. Bauman
Jaggar-Sroufe Co.
E. L. Knight & Co.
R. W. Larsen
Morrison Electric Co.
Western Electric Works
E. L. Knight & Co.
NePage-McKenny Co.
Pierce-Tomlinson Co.
Portland Elec. Maintenance Co.
Scott Electric Co.
Smith-McCoy Electric Co.
Vanderlip & Lord
G. R. Cooley, of Seattle

Mr. Kenny reported for the special committee on the proposed electric show, that there had been no meeting of the committee on account of his illness.

A motion was carried that the next meeting be devoted to a special order of business to discuss important points in the new Code and the advisability of having the National Underwriters' Code written into the city ordinance, with the addition of the necessary administrative clauses.

Mr. Sroufe of Jaggar-Sroufe Company, in a very able and interesting way, discussed the Electrical Contractor in his relation to the Electrical Industry as a whole.

Mr. Cooley, of Seattle, was called on and reviewed the contracting situation in his city for the past few years, and dwelt on the absolute necessity of open-minded discussion of problems as they arise and of fair dealing between members of the electrical industry and the public.

Synchronous Club of Los Angeles

The new year opened auspiciously for the Synchronous Club of Los Angeles on the evening of January 15th, when the regular monthly meeting was held. The auditorium in the Edison Building was well filled on this occasion. Mr. F. A. Short, representative of the State Industrial Accident Commission for the Southern District, gave an interesting and instructive talk on the new safety rules. After the meeting the members adjourned to the Edison lunch room where refreshments were served.

Civil Engineers of Southern California

The regular monthly meeting of the Southern California Association of members of the American Society of Civil Engineers was held at the Jonathan Club in Los Angeles on the evening of February 11th.

Following an excellent dinner, Mr. Roy V. Reppy delivered an address on "Political and Legal Aspects of Flood Control." This address was part of the symposium on flood control which this organization has been conducting for the past year.

Mr. Reppy was followed by W. H. Code, who spoke on "Financial and Executive Organization of the California Conservancy Act."

Northwest Power Association

The Public Policy Committee for Oregon, of the Northwest Power Association, met in Portland on Jan. 29th, 1920, and considered the proposed rules of the Public Service Commission of Oregon covering service extensions. It was the sense of the committee that this method of filing rules of general application is not feasible, as the question of the financial and operating practice of the utilities is not considered; but the Commission might well require the individual companies to file an extension tariff in conformity to their own peculiar conditions of financing. A hearing could then be held and the Commission could determine the reasonableness of same, based upon each company's experience.

Also the committee asked the Commission to defer the enforcement of the Modified Accounting Classification, effective Jan 31, 1920, in regard to Property Accounts, and asked for a hearing on same.

Meeting of Engineering Societies

The members of the various engineering societies of Portland, Oregon, were addressed by Dr. Dexter Kimball, dean of engineering at Cornell University, at the University Club, Thursday evening, Jan. 29, 1920. The meeting was under the auspices of the American Society of Mechanical Engineers. Mr. Kimball's address was on "The Engineer's Broader Field of Activities." He said in part:

"The engineer will be called upon in the near future to solve the question relating to the proper and just distribution of wealth, as he is the one who knows the industries—the politician does not—as this country is primarily an industrial country. The engineer has been only concerned in the production of wealth and has always shunned the problem of the just and proper distribution of same. In other words, the engineer has gotten this country into an 'industrial mess,' and he is the logical one to straighten it out. Our country has solved the production of food and wealth, and to have the government endure, where other forms have failed, it must solve the problem of justly distributing that wealth among everyone according to their labors in producing it."

The forming of an Engineering Council in Oregon was discussed but no action taken.

Seattle Section, A. I. E. E.

The Seattle Section of the American Institute of Electrical Engineers met at the Arctic Club assembly room on January 20th with sixty members and ten visitors present. Chairman G. E. Quinan presided. An executive committee of three members was appointed consisting of Harisburger, Magnusson and Ross. The papers and meetings committee will consist of C. F. Terrell, chairman, E. S. Code, Mr. Lund, F. D. Nims, and another member not yet selected. Mr. Lindsay reported on the meeting of the council of the Associated Engineering Societies at the Engineers' Club on Friday evening, January 16th. Activity of the council for this year was discussed at the meeting and an outline of the proposed program was read by Mr. Lindsay. General discussion followed and on motion the matter was referred to the executive committee for report at the February or March meeting. The chairman expressed the desire that a large representation from the Section be at the Pacific Coast convention to be held at Portland July 21-23. A letter was read from C. S. Van Dyke, chairman Schenectady section, suggesting suitable commemoration of the one hundredth anniversary of important electrical discoveries. On motion the Section voted that the centennial be commemorated in the manner proposed. Professor William Spraragen presented a paper on "Electric Welding of Mild Steel," with particular reference to shipbuilding. During the war the speaker was connected with the National Research Council as assistant chairman of the Welding Research Committee. Recent developments in electric welding were described, of which a large amount had

been performed for the shipping board. Presentation of the paper was followed by discussion in which various members participated.

Jobbers' Annual Meeting

The Annual Meeting of the Pacific Division of the Electrical Supply Jobbers' Association is scheduled for Feb. 26th, 27th and 28th at the Hotel Del Monte. The secretary has sent out the following concise message:

"If you are coming, specify number of persons and reservations required. If you are not coming, do not tell me about it. If you are sick, come and take a little white golf pill and drink of the waters of Del Monte and get cured. If you are too busy, come and learn how to handle too much business with profit to yourself. If you are not busy, come and learn how to get busy. Come first and tell your troubles afterwards to the Secretarial of the League of Nations."

The Ten Foot Candle Club

The Sunbeam lighting specialists with the Western Electric Company, located in the various houses throughout the country, have organized the Ten Foot Candle Club to cooperate with the various associations, such as the Illuminating Engineering Society, in the campaign to promote the use of higher intensities in the illumination of factories and mills. The club has adopted as its slogan—"Devoted to the Promotion of Adequate Illumination Properly Diffused and Without Glare." There are no dues, and no officers except T. J. Rider, Jr., of the Chicago Sunbeam office. Mr. Rider founded the club, and signs himself "Lumen." The club has its own stationery, with the Foot-Candle Meter forming the most conspicuous part of the design, and containing a list of charter members.

Electrical Golf Club

Members of the electrical fraternity in Los Angeles have organized an informal golf club which conducts a game every Thursday afternoon at the San Gabriel Club links. "Jim" Pomeroy is president of the organization and F. H. Murray is secretary. The membership includes manufacturers, jobbers, dealers, contractors and central station men. Any follower of Mr. Kilowatt is welcome to come out and join the game, according to Mr. Pomeroy.

Each Thursday a small cocktail cup (a representative of the Journal repeated this question and is quite sure that is what Pomeroy said) is given to the man who turns in the best score. Later a large cup will be given to the member collecting the most small ones. February fifth the honors went to M. B. Austin of Chicago, who turned in a card of 73 net with a 24 handicap.

WESTERN MEETINGS

Feb. 10. A. I. E. E. and N. E. L. A., Portland sections—E. L. Kavanaugh—The Electric Furnace for Brass Melting.

Feb. 10. Synchronous Club of Los Angeles—Capt. J. H. Pengilly — Illuminating and Eliminating the Hun Bomber.

Feb. 12. Engineers' Club of San Francisco—E. R. Jackson—Fighting For Liberty Under President Lincoln and President Wilson.

HAPPENINGS IN THE INDUSTRY

PLAN OF WIRING COMMITTEE, COMMERCIAL SECTION, N. E. L. A.

The Wiring Committee in planning to investigate portable cords for heaters is arranging for some laboratory tests, but it understands and believes that the laboratory tests, or at least the first ones that will be made, will not give the practical or commercial values of the cords. In fact, what it is really aimed to do is to test the tests by comparing the results of the first tests with commercial experience, and then by devising and arranging for other tests, finally to get a form of tests which shall as nearly as practicable conform to commercial and practical experience.

For this purpose, the Wiring Committee hopes to get the managers of some of the appliance departments of central stations to give the results of their experience.

The Wiring Committee will prepare sheets in which the various cords to be tested will be described according to their trade name and specifications.

The gentlemen will then be asked to rate the different cords, as No. 1, No. 2, etc.

The average of the ratings of a number of different appliance department managers will be computed with the thought that such averages will give the best information at present available as to the commercial value of the different cords.

The following gentlemen have volunteered to rate the cords, but in addition the Wiring Committee would like to have a number of others, and if any central station man who is familiar with the cords on the market will volunteer to do this the Wiring Committee will be very much obliged. If he will send his name to Mr. R. S. Hale, chairman, 39 Boylston street, Boston, Mass., the list of cords, trade-marks, etc., will be sent.

Boston—C. E. Greenwood
Baltimore—Dorsey Smith
Chicago—A. G. DeClercq
St. Louis—C. Michel
New York—Mr. Lewis
Philadelphia—H. Calvert

It will not be necessary for the gentlemen to rate each and every cord, but of course if there is a cord which they do not rate, because they have never seen or examined it, that will be omitted and the appropriate adjustments will be made in calculating the averages from their report.

ENGINEERS FAVOR HOOVER

The following resolution, favoring the "Hoover for President" movement, has been passed by the Joint Council of the Engineering Societies of San Francisco:

Whereas, There is at this time a strong and widespread sentiment for Mr. Herbert C. Hoover for President of the United States as an independent candidate, free from political deals and pre-election pledges; and

Whereas, Mr. Hoover, by his work in Europe, has shown executive and administrative abilities of the highest order, particularly fitting him for handling both the economic problems of reconstruction at home, and our relations with other nations; and

Whereas, The Joint Council of Engineers of San Francisco has a patriotic duty to perform at this time, not only as representing engineers, but also as a representative body of American citizens; be it therefore

Resolved, That the Joint Council of Engineers of San Francisco, representing 2,000 engineers in the Bay district, endorses Mr. Herbert C. Hoover for President and invites the engineering bodies of the United States to join with it in forming an organization to further Mr. Hoover's election, and in such other activities as will insure the affairs of the nation being handled on an efficiency and non-partisan basis; and be it further

Resolved, That copies of this resolution be sent to all engineering organizations and technical journals throughout the United States, and that such other steps be taken as will further the movement of "Hoover for President."

PUBLIC UTILITY RATE HEARING

The application of the Mount Whitney Power and Electric Company for an increase in rates, brought some important figures before the California Railroad Commission

YOU CAN LEAD an electric appliance to a lamp socket, but you cannot make the customer use it —

AN OUTLET FOR EVERY APPLIANCE

recently. At the hearing H. A. Barre, electrical and mechanical engineer of the Southern California Edison Company, of which the Mount Whitney Power and Electric Company is a subsidiary, stated that rates now in force, including a 15% surcharge allowed some time ago, total a revenue of only $1,588,000 in the year 1920, while the total revenue required to meet all necessary expenses will be $1,764,050. In 1919 the company's revenue totaled $1,360,584.

The company has submitted a rate schedule involving an average increase of 11% over present charges.

ELECTRICAL PRODUCTS COMPANY IN NEW HOME

Having outgrown their present quarters, the Electrical Products Corporation of Los Angeles have moved to their recently completed factory building at 1128-1134 West Sixteenth street. This company, which makes a variety of electric signs, moved three years ago to the factory which is now being abandoned. At that time Paul D. Howse said, "These new quarters will accommodate us for years to come."

The new factory is three times the size of the former one and again Mr. Howse, president of the company, is saying that his concern will not have to move for many years. The new factory and its equipment are modern in every respect and second to none in the country. The new factory, which was built and is owned by Electrical Products Corporation, will also be manufacturing headquarters for the Tucker Electric Sign System.

LOS ANGELES GAS AND ELECTRIC CORPORATION BANQUET

Two hundred and forty members of the Los Angeles Gas and Electric Corporation organization have been in the employ of the company for over ten years. They are called the "Old Guard" and each year have a banquet. This annual affair was held at the Alexandria Hotel on the evening of February 4th.

Mr. O. L. Moore, auditor for the company, acted as chairman and many entertainment features were put on by the members. These included a minstrel show and music by the company band.

THE WATER POWER BILL

The purpose of the water-power bill introduced in the House of Representatives and which was referred to the Committee on Water Power is: "To create a Federal Power Commission and to define its powers and duties; to provide for the improvement of navigation, for the development of water power, for the use of the lands of the United States in relation thereto, and for other purposes. The entire Act has 29 sections. Significant extracts are as follows:

"Be it enacted by the Senate and House of Representatives of the United States of America, in Congress assembled, that a commission is hereby created and established, to be known as the Federal Power Commission (hereinafter referred to as the Commission), which shall be composed of the Secretary of War, the Secretary of the Interior and the Secretary of Agriculture. * * *

"Sec. 4. That the Commission is hereby authorized and empowered—

"(a) To make investigations and to collect and record data concerning the power industry and its relation to other industries and to interstate or foreign commerce, and concerning the location, capacity, development costs, and relation to markets of power sites, and whether the power from navigation dams can be advantageously used by the United States for its public purposes, and what is a fair value of such power, to the extent it may be necessary or useful for the purpose of this act. * * *

"(d) To issue licenses to citizens of the United States, or to any association of such citizens, or any state hereof, or to any state or municipality for the purpose of constructing, operating and maintaining dams, water conduits, reservoirs, power houses, transmission lines, or other project work necessary or convenient for the development, transmission and utilization of power. * * *

"(h) To perform any and all acts, to make such rules and regulations and to issue such orders not inconsistent with this act as may be necessary and proper of carrying out the provisions of this act."

LEGISLATION AFFECTING UTILITIES

The Governor of Oregon has signed three bills which affect utilities in that state. One increases the compensation to workmen 30%, another increases the bond limit for roads from 2 to 4% based upon the assessed valuation, and a third provides for making up the deficit of the Public Service Commission for the fiscal year.

Six bills, affecting utilities and engineers, were vetoed. One of these concerned amendment to the professional engineers' registration laws. The other five involved salary increases for the State Engineer, Highway Engineer, Sealer of Weights and Measures, safety inspectors in the Bureau of Labor, and for several county engineers.

PUBLIC UTILITY FINANCES IN CALIFORNIA

Electric railways of California in 1918 reported net operating revenues of $8,257,428.37 as compared with $8,240,703.01 in 1917. The net revenues of the United Railroads of San Francisco increased from $743,675.14 in 1917 to $2,462,446.08 in 1918. The increase is due to more favorable operating conditions, the company having no strikes and less jitney competition in 1918.

The water companies of the State, according to the Railroad Commission figures, reported net operating revenues of $4,009,765.96 as against $4,099,931.73 in 1917, a decrease of $90,165.79.

The net revenues of the electric companies reported for 1918 showed a total of $16,969,638.87. In 1917 the total was $16,123,663.47.

Water, gas and electric, telephone and telegraph companies, and steam and electric railways, filing annual reports with the Commission, collected in 1918, in the form of rates, the sum of $576,154,003.08, an increase of $59,490,213.91 over the $516,663,789 collected in 1917. The operating expenses of the same utilities during 1918 are reported at $420,242,463.28, an increase of $81,650,518.51 over 1917. There was a decrease in the net operating revenues of the same utilities for 1918, the reports showing $155,911,539.80 for 1918 as against $178,071,844 in 1917, the difference being $22,160,304.20.

DESTROYED PLANT BEING REBUILT

The Remmert Manufacturing Company's electric washing machine factory at Belleville, Illinois, was destroyed by fire on the 27th of January. Due to a freight embargo some seven hundred finished machines were on hand waiting shipment. There was also a stock of all materials, except some motors, necessary to make one thousand machines. The entire stock of finished machines, parts, raw materials as well as factory building and machinery, were entirely destroyed. The cause of the fire is not known. It started in the oil house and spread so rapidly that it was only possible to save the office records and a sample of the new 1920 model machine which would have been put into production in February.

The work of rebuilding the factory was started almost immediately after the fire. New dies and jigs are being made in a rented machine shop and the company hopes to start building washing machines again by March 1. The physical loss was about covered by insurance.

NEW NORTHWESTERN POWER PLANT

The Lebanon Electric Light & Water Company, of Lebanon, Oregon, is making preparations for the erection of a new plant on the north side of the canal and the west side of Main street. Work has commenced on a temporary flume to carry the water around the new plant. Two new water wheels, new electric generators and new pumping equipment will be added. The plant will have double the capacity of the present works.

IMPROVEMENT IN POWER LINE

The Wise power line of the Pacific Gas & Electric Company is being extended 5.2 miles to Newark substation and will be operated at 110,000 volts when completed. In the near future a second circuit will be added to the Wise line from Drum power house to Newark substation via Halsey and Wise power houses, a total distance of 161.5 miles. Both of these improvements will afford greatly increased transmission capacity from hydroelectric plants in Placer, Nevada and Yuba counties to the south bay district.

THE BUREAU OF STANDARDS

A Letter to the Editor

(The Bureau of Standards is often misquoted as to its activities and its fields of investigations now engaging its experts. Here is a letter from the chief physicist of the Bureau that should prove helpful in clearing up some of these misunderstandings.—The Editor.)

The Bureau is now working under an appropriation for its public utility work for the fiscal year ending June 30th, 1920, stated as follows: "For the investigation of the standards of practice and methods of measurements of public utilities, such as gas, electric light, electric power, water, telephone, and electric railway service, and the solution of problems which arise in connection with standards in such service * * *."

This has nothing to do with the study of rates, valuation or capitalization, which I understand you to mean by public utility ethics, and the Bureau has no plans whatever for such studies.

Our Circular 32, "Standards for Gas Service," and 56, "Standards for Electric Service," do cover very fully and completely such subjects as meter errors, methods of testing and maintaining meters, gas pressure variations, voltage variations, interruptions in service, impurities in gas furnished, and certain questions of public relations often included in service standards, and include complete summaries of all public service commission regulations now in force in each state.

Circular 32 is now being revised for its fourth edition and only two weeks ago a conference was held here at the Bureau with a committee of the American Gas Association and other interests, including the state commissions, to whom the whole manuscript of the revised circular was submitted for criticism and comment. The committee agreed unanimously on nearly every question brought up for discussion. Circular 56 is also being revised, and as soon as the material is in shape, it will be submitted to all interested parties for criticism before it is published. This is the established practice of the Bureau, and we feel that few publications are issued anywhere that have received such careful consideration and widespread opportunity for criticism.

I want again to call your attention to my full discussion of the Bureau's methods in my paper published in the Journal on July 15, 1919, and hope you may be able to make it clear to your readers that the Bureau in no wise interferes in any manner whatsoever with the work of public utility commissions. On the contrary, the Bureau's work has been cordially welcomed by the commissions and by utility operators, when its scope and purpose are understood. I should be glad to know whether you personally approve of the very thorough cooperation with the Bureau of the state commissions and the industries, and whether you think there is any ground for complaint against the Bureau. Are you familiar with the Bureau's work and publications?

Respectfully,

E. B. ROSA,
Chief Physicist.

TRADE NOTES

Increase of Capital and Capacity —

The Lapp Insulator Company of Le Roy, New York, is erecting an additional factory and installing a considerable amount of new machinery in order to increase its capacity 50% within the next five months. Its capital is also being increased from $150,000 to $500,000 to take care of rapidly increasing business.

New Electrical Contracts —

The National Electric Company are installing the electrical work in the new building of the Francis Motor Car Company, Portland, Oregon.

The West Coast Engineering Company are installing the electrical equipment in the new mill of the West Oregon Lumber Company at Linton, Oregon.

E. L. Knight and Company have the electrical contract for the new garage at 775 Washington street, Portland, Oregon.

The Blue Bird Electric Shop of Tacoma won the contract for the electric fixtures for the new $300,000 apartment house being built at Eleventh and Prospect streets, Seattle, Wash. This was won in open competition with the leading fixture houses of the Pacific Coast. The cheapest rent for apartments will be $225 per month and upwards, on a two-year lease.

Election of Officers —

The regular annual election of officers and directors for the Los Angeles Gas and Electric Corporation was held on January 28. There were no changes made in the present organization, consisting of: W. B. Cline, president; Wm. Baurhyte, C. S. Vance and C. A. Luckenbach, vice-presidents; T. P. McCrea, secretary; Horace Cline, treasurer; W. E. Houghton, Comptroller, and A. B. Day, general manager.

New Contract —

The NePage-McKenny Company have the contract for the electrical installation in the new building of the Honeyman Hardware Company, 9th and Glisan streets, Portland, Oregon.

New Offices —

In addition to the district sales offices recently announced by The Booth Electric Furnace Company, a Detroit office has been opened in charge of M. A. Beltaire, Jr., at 805 Hammond Building, as well as an office at Birmingham, Alabama, in charge of Gassman and Cunningham, Brown and Marx Building.

Announcement is also made of the sale of a two-ton Booth two-phase steel melting furnace to the Cincinnati Steel Castings Company, Cincinnati, Ohio.

Election of Officers —

At the meeting of the Board of Directors of Rathbone, Sard & Company, held Jan. 28, 1920, the following officers were elected: Russell E. Sard, president; John D. Green, vice-president; Arthur M. Blanchard, vice-president and secretary; Sidney H. Kent, treasurer; William E. Palmer, assistant secretary.

H. H. Daley, who recently assumed his duties as sales representative of the Majestic Electrical Development Company, has been making a trip through the Pacific Northwest and the intermountain territory. Mr. Daley was at one time a salesman with the Pacific States Electric Company, and has been for many years well and favorably known in the West as electrical salesman with various concerns. He brings to his new work the results of extensive practical experience, together with the good wishes of a host of friends.

GOOD THINGS always come in threes, provide a socket for each one —

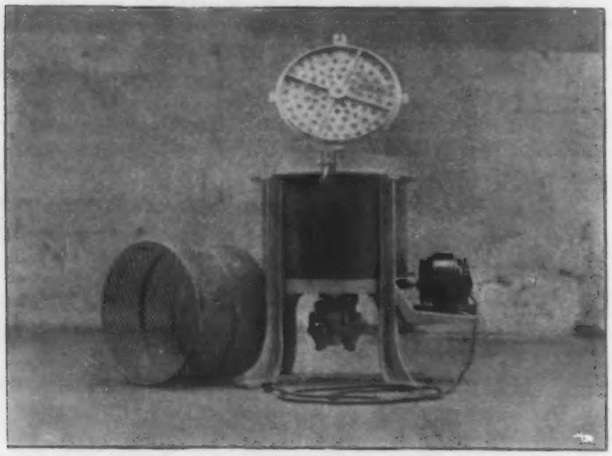
AN OUTLET FOR EVERY APPLIANCE

LATEST IN EVERYTHING ELECTRICAL

(The final addition to the electric laundry, to make it complete, is now forthcoming in the shape of an electric clothes drier. Among other devices reviewed here are a handy electric water heater and an improved searchlight for automobiles.—The Editor.)

AN ELECTRIC CLOTHES DRIER

An electric clothes drier, invented and manufactured by R. M. Miller of Oakland, and handled by the Domestic Electric Appliance Company, 1533 Clay St., was built for use in the home and of the same capacity as the average electric clothes washer. It operates on the centrifugal principle, the outer diameter of the basket which contains the clothes traveling at 7000 ft. per minute, throwing the water out, which in turn is replaced by air drawn in from the center and forced through the clothes. It will dry for ironing in from 12 to 15 minutes with no danger of injury to the finest piece of goods, no broken buttons, no clothes line or clothes pins.



Another addition to the electric laundry—a clothes drier which will dry for ironing in from 12 to 15 minutes.

The machine occupies a space of 24 inches by 30 inches and stands 26 inches high, weighing approximately 200 pounds. It is operated by a ¼-hp. electric motor (cost approximately 2 cents per hour) through a governor clutch mounted on the driven shaft, and is automatic in its action of pick-up the load, the load also governing the clutch. This clutch makes it possible to start the load with a motor just big enough for running the load, or nearly so.

This machine makes it possible to have a complete home laundry, as washing and ironing machines have been on the market some time.

IMPROVED AUTOMOBILE SEARCHLIGHT

An improved model of the "Red Spot" searchlight for automobiles is offered by the F. W. Wakefield Brass Company of Vermilion, Ohio. The unique feature of this model is a small deflector and lens in the housing of the lamp which throws a red beam to the rear, thus making it a practical one-bulb "parking light."

Motorists will quickly appreciate the economy and desirability of this device. Cars parked at night at the curb or roadside must be lighted front and rear to comply with the law, and for protection against collision. This commonly requires that sidelights and tail light be left burning sometimes for several hours at a time—a very serious drain upon the batteries, especially in winter when starting takes more than the normal amount of energy.

The manufacturer of the "Red Spot" points out that not only does his invention provide adequate and legal front and rear lighting from a single lamp, but that this light is placed in the position on the car which will insure the greatest protection, since the searchlight is invariably mounted at the extreme left side and well outside the wind shield frame so that passing vehicles will naturally give the parked car plenty of clearance.

An automobile searchlight which serves several purposes

The parking light feature makes the "Red Spot" searchlight a triple duty accessory. In normal service it is a keen and penetrating searchlight with easily adjustable focus and wide range. In emergency and by a single touch of the finger it becomes a red danger signal. Now, with the rearward deflector and lens, it becomes also an economical and safe parking lamp.

The Hotvent electric water heater. In residences, if the proper size of heater is used, covering for tank or piping is unnecessary.

AN ELECTRIC WATER HEATER

A convenient and efficient electric water heater is being advertised by the Aetna Electric Appliance Company of Boston, Mass. The 2500-watt heater is barely 8 inches long by 5 inches in diameter and weighs only 13 lbs. It has nearly 100 square inches of heating surface. It is economical and durable, and is made in all sizes to fit any tank. One of the recent uses to which it has been put is to keep the water at boiling point on steam fire engines, so that it will take but a very few minutes to get a working head of steam.

Book and Bulletins

The Outlook for Research and Invention

By Nevil Monroe Hopkins, M.Sc., Ph.D.; 241 pp.; size 7¾ by 5¼ in. Published by D. Van Nostrand Company, New York, and on sale at the Technical Book Shop, Rialto Building, San Francisco. Price $2.00.

The avowed object of this interesting and attractive book is to stimulate a more general interest in the broader aspects of American research, to point out the educational requirements which best develop the inventive faculty, and to indicate the directions which will steer clear of inefficient duplication of effort. The volume includes among other things a review of American war research, photographs of some famous inventors, with brief accounts of their development, and a chapter on the making and protecting of inventions. A valuable appendix is added in the form of a list of practical problems awaiting solution.

Radio Engineering Principles

By Henri Lauer, B.S., and Harry L. Brown, B.E.E. 300 pp.; size 6¼ by 9¼ in. Published by the McGraw-Hill Book Company, Inc., New York, and on sale at the Technical Book Shop, Rialto Building, San Francisco. Price $3.50.

As a general text book on radio covering the many new developments in the field made during the war, this volume fills a very definite need. It is devoted mainly to a study of the characteristics and use of the three-electrode vacuum tube in radio-telegraphy and radio-telephony, but the principles involved in the older radio apparatus are treated in sufficient detail to inform the student on all essential principles of wireless communication.

The volume is well arranged and well printed. It contains twelve plates and a large number of line drawings which are an invaluable addition to the text.

The Business Library—What It Is and What It Does

By Louise B. Krause. 117 pp.; 5 by 7 in. Published by the Technical Publishing Company, and on sale at the Technical Book Shop, Rialto Building, San Francisco. Price $1.50.

This compact little volume, just off the press, is a unique publication dealing with a subject which has only recently leaped into prominence. The material is a composite study of many business libraries, based on long experience and resolved into a practical analysis of every detail of the business library, its particular service to the organization, and the most efficient method of handling it. The volume is fully illustrated throughout, and each chapter concludes with a list of references for additional reading on the particular subject treated. It serves not only to indicate the immense possibilities of the well-conducted business library, but is an authoritative practical guide for the librarian and the business man in the handling of this increasingly important department of an up-to-date business house.

Industrial Calendar

An interesting and attractive calendar was sent out recently by the Youngstown Sheet and Tube Company of Youngstown, Ohio. It contains twelve duotone views, 8 by 15 inches, made from photographs in the Youngstown Company's works, and is useful and informative as well as an attractive piece of publicity. The company is willing to mail it to anyone interested, on the receipt of six cents to cover postage.

A New House Organ

The Benjamin Electric Manufacturing Company's new house organ, "The Benjamin Reflector," is a sturdy newcomer who promises to make a name for himself if subsequent issues live up to the standard set by the first. In eight pages this initial issue comprises a number of brief articles, and smaller items of general interest, as well as much of the friendly, personal material which contributes so much to a company's sense of unity. We wish the Benjamin Reflector the best of luck.

Cutler-Hammer Publication

The Cutler-Hammer Manufacturing Company of Milwaukee have revised and reprinted two of their standard descriptive booklets known as Booklet "A" and Booklet "S."

Booklet "A" describes C-H Motor-Operated Brakes for alternating current service, made for application similar to the direct current Type M magnet brake, such as for cranes, elevators, mine hoists and other kinds of conveying and hoisting machinery. A recent interesting application was made on a large plate planer to prevent over travel of the tool and consequent damage to the machine in case of failure of power or other emergency, necessitating a quick stop.

Booklet "S" illustrates and describes the C-H Magnetic Separator which is used in 35 different industries. The three principal uses may be classified as follows:

1. Cobbing, or removal of stray iron that would injure crushing, grinding or cutting machinery.
2. Recovery of iron for its intrinsic value, as found in refuse sands from foundries, garbage, etc.
3. The purification of products.

Cement plants use magnetic separators in two places; one to prevent the entrance of iron or steel into the crushers and pulverizers used in crushing the rock and the other to prevent magnetic material from entering the coal pulverizer. The latter use is especially recommended since it has been shown that a spark caused by iron or steel getting into the pulverizer may cause a violent explosion of a mixture of air and coal dust emitted from the pulverizer.

More pertinent information, new engineering data, new installation views and the explanation of new uses were the primary reasons for re-editing these two booklets.

Lighting Fixtures

With the publication of its new catalog No. 120, the F. W. Wakefield Brass Company of Vermilion, Ohio, announces several new lines of lighting fixtures so arranged and standardized as particularly to appeal to dealers and contractors serving the great middle-class demand. The lines are several named, Homeric, Heroic, Heraldic and Hendrick, and consist of assortments to meet every standard need. In addition, the catalog lists the Wakefield commercial units designed for use with Ivanhoe, Phoenix and other glass in combination with high-powered lamps.

Farm Lighting and Power Equipment

The Delta-Star Electric Company, Chicago, Illinois, have issued Bulletin 35 detailing plans for serving farmers from high tension lines. It contains considerable data on various forms of contracts for taking on this service at a profit to central stations, and is illustrated with a large number of photographs and line drawings.

Switches

A very complete catalog has recently been issued by the Trumbull Electric Manufacturing Company of Plainville, Conn. It consists of some 160 pages fully illustrated, and has a heavy dark green paper cover with the Trumbull trade mark, the "Circle T" in bright red on the front. It is bound in a unique manner—by means of three heavy fasteners—enabling one or any number of the heavy glazed pages to be removed without injuring the catalog.

FAINT HEART ne'er won fair wiring contract —

AN OUTLET FOR EVERY APPLIANCE

NEW ELECTRICAL DEVELOPMENT

(Continued progress is reported on the large power projects in the Northwest, while extensive financial dovelopments are under way in the Pacific Central district. Ornamental street lighting and a number of irrigation projects are features of Southwestern news, and numerous hydroelectric undertakings and line extensions are reported from the Intermountain region. —The Editor.)

THE PACIFIC NORTHWEST

TACOMA, WASH.—The R. R. Lang Company, electrical contractors and engineers, have opened offices here at 109 South Ninth Street.

VANCOUVER, B. C.—The Shipton Electric Pig Iron and Steel Smelting Company, Ltd., has been incorporated here for $250,000.

KIRKLAND, WASH.—The Occidental Rubber Company of this city will build a new plant in which an electric drive is to be installed.

LEAVENWORTH, WASH.—It is reported that the Tumwater Light and Power Company of this city is planning to build a modern plant.

WENATCHEE, WASH.—It is reported that a large electric power plant will be erected at the mouth of Chelan River and that the Great Northern Railway is backing the project.

SALEM, ORE.—The depelopment of power near Early, Oregon, is contemplated in an application filed with the state engineer's office by Homer S. Wall of Wasco, covering the appropriation of 300 second feet of water from the John Day river.

EVERETT, WASH.—Architect A. H. Albertson, 725 Henry Building, Seattle, has prepared plans for a one-story banking building for the Securities National Bank of this city, which will cost about $75,000. An indirect lighting system will be installed.

SEATTLE, WASH.—Sub-letting of part of the Cedar Lake power unit steel pipe contract to the Western Pipe & Steel Company of San Francisco by Willamette Iron & Steel Works, Portland, has been approved by the finance committee of the city council.

WENATCHEE, WASH.—The Wenatchee Valley Gas and Electric Company is erecting a concrete building to house its steam generator station, with a capacity of one thousand hp., which is to be in operation by April first. The total cost is estimated at $80,000.

SEATTLE, WASH.—The city council has adopted an ordinance appropriating $200,000 to finance construction of the street railway extension on East Marginal Way. The installation of a double-track line will probably begin at Carleton avenue and East Marginal Way and extend on East Marginal Way to First Avenue.

SEATTLE, WASH.—An appraisal is being made of the Seattle & Rainier Valley Company's lines and equipment by the city of Seattle in order to determine the price which the city should pay for the property should it be desired to take over the only privately owned line in the city. The property was offered to Seattle recently for $1,656,000.

YAKIMA, WASH.—Electric Power & Appliance Company has been incorporated for $25,000, by Albert L. Shroeder, C. H. Kirby and Arthur L. Fullbright. The company will maintain a farm lighting plant department and will handle all lines of electrical accessories and appliances manufactured by the Western Electric Company.

WALLA WALLA, WASH.—It has been decided by the city water commission to extend the pipe line to a new diversion dam to be built in the Wenaha forest reserve. Next a pipe line will be built from the reservoir site to the city, and a third reinforced concrete reservoir will be built, not to exceed 24,000,000 gallons capacity, with the balance of the funds.

SEATTLE, WASH.—Sealed proposals will be received by the board of public works, up to March fifth, for the construction of twenty-two miles of railroad from Rockport to the site of the proposed Skagit River power plant. The estimated cost of this project is $450,000. According to C. F. Uhden, chief engineer for the Skagit project, work on an extensive scale on the plant will not begin for at least eight months or until the railroad has been constructed. At present a sawmill is being constructed and camp site made ready, preparatory to blasting rock for the roadway.

WALLA WALLA, WASH.—Applications have been filed with the state hydraulic engineer by W. F. Crowe and others for diverting some of the water of the Touchet river at Bolles and carrying it by canal to lower Eureka flat land. The project would take in about 72,000 acres in the Prescott and flat sections. It is proposed to build a canal 12 feet wide and eight feet deep to carry the water. The proposed ditch has been surveyed. The cost of the improvement is estimated at $2,000,000 and will be financed by the formation of irrigation districts and issuance of bonds, the sale of which has already been assured to eastern capitalists.

PORT ANGELES, WASH.—By approving the assignment of the sublease of Ediz Hook spit lands from George F. Whalen to the Washington Pulp & Paper Corporation of Virginia, the city council cleared the way for that corporation to commence work on its $2,500,000 paper plant. The plant as planned will have a capacity of about 60 tons a day. Zellerbach Paper Company of San Francisco is heavily interested. Power will be supplied both from the Olympic power plant on the Elwha river and from a specially constructed steam plant at the pulp and paper mill. Chris Kuppler & Sons of this place and Seattle, contractors, are making arrangements for materials and labor for construction of the first four buildings to house the plant.

SEATTLE, WASH.—The city utilities committee considers the recommendation of Superintendent of Lighting, J. D. Ross, for the sale of $1,005,000 of light extension bonds, already authorized and agrees to the issuance and sale of $1,000,000 more bonds for light and power extensions. When $750,000 of an issue of $1,755,000 for light and power extensions was authorized, an estimate was furnished of the extensions proposed, including $195,000 for reconstruction of the penstock between Cedar Falls dam and Cedar Falls power plant. The new request is for $570,000 more for this particular improvement and as a result of a conference, a committee of three was appointed to consult with Superintendent Ross in an attempt to pare down the estimates to the $1,005,000 of bonds authorized and yet unsold.

SALEM, ORE.—E. G. Hopson, engineer, 205 Central Building, Portland, filed application with State Engineer Percy A. Cupper to take 1,400 second feet of water from the Metolius River in Crook county for commercial light and power purposes. It is the intention to construct a cyclopean concrete dam 50 feet high and 500 feet long at the top. The headgate and semicircular canal will also be of concrete. Turbines will be connected with electric generators and a fall of 140 feet is expected to develop 18,000 theoretical horsepower. The cost is estimated at $1,300,000. It is anticipated that work will start as soon as pending federal legislation, permitting the utilization of power on public lands is enacted. Hopson also makes application to take $1,200 second feet of water from the Metolius river in Crook county for commercial light and power. This dam is to be 20 feet high and 650 feet long at the top. It is to be of rockfill and concrete with headgate and circular canal of the same material. Turbines connected with electric generators will develop 43,000 horsepower, using a fall of 360 feet. The cost of this project is to be $1,500,000. Work will begin as soon as the legislation above referred to is enacted.

THE PACIFIC CENTRAL DISTRICT

DAVIS, CAL.—A resolution has been adopted setting forth the sale of $75,000 of city bonds for the erection of a municipal water system.

TRACY, CAL.—The board of directors of the Naglee Burk irrigation association has let to J. E. Johnston the contract for lining with cement and shaping 180,000 square feet of ditches in the district.

MARYSVILLE, CAL.—The Yuba County Board of Supervisors will appropriate $1000 for preliminary surveys of the proposed Yuba-Nevada-Sutter Irrigation District advocated by the Yuba-Nevada-Sutter Water and Power Association.

SAN FRANCISCO, CAL.—A third hearing before the Irrigation Board of the Miller & Lux corporation for permission to create an irrigation district of 113,000 acres in Kern and Tulare counties, riparian to Kern river, was postponed until May 3.

OAKLAND, CAL.—The Western Power Company is building a power line from the American Manganese plant to the Parr Terminal property, for the purpose of supplying light and power for the new wharves and warehouses which are being constructed by R. W. Littlefield.

SAN FRANCISCO, CAL.—The Board of Public Works asked the Supervisors to make available from the water construction fund $12,341 to cover the cost and delivery of 24-inch riveted steel air pipe for the Hetch Hetchy project. The contract was awarded the Montague Pipe and Steel Company.

SACRAMENTO, CAL.—Application for permission to divert 20,000 cubic feet a second of water from the Tuolumne river for power and irrigation purposes has been made by the Modesto irrigation district. It is proposed to build dams, power-houses and a distributing system at a cost of $16,000,000.

STOCKTON, CAL.—Western States Gas & Electric Company recently began service in the town of Valley Spring, located about thirty miles east of here, on the company's 60,000-volt transmission line. Practically every house and business establishment in the town has been connected. The company also supplies the street lighting.

WESTWOOD, CAL.—The Red River Lumber Company plans to establish a construction camp on Clear Creek, near here, and to build a dam across Feather river. The dam is to be a part of a hydroelectric power development scheme by which the company plans to develop 5,000 horsepower of electric energy for use in driving the machinery in the company's sawmills here. The plan to use electricity is prompted by a present fuel shortage.

EMERYVILLE, CAL.—A. H. McLaren, electrical engineer, is laying out additional equipment for the American Rubber Company, whose factory is located on Park Avenue. The American Rubber Company's business has increased so rapidly the last few years that it is necessary for this firm to double their manufacturing capacity.

ALAMEDA, CAL.—Superintendent Jos. Kahn reports that the demand for electricity on his side of the estuary, for power purposes, has increased very materially within the last twelve months. The Associated Oil Company is about to erect a large station at the Webster street bridge, on the Alameda side, where they will install upwards of 150 horsepower in electrical motors.

STOCKTON, CAL.—Sherman A. Jubb, engineer, filed with the city council plans for Stockton's new harbor in connection with the deep-water-to-the-sea project. The commissioners are said to favor the plan unanimously. The specifications call for widening the head of the channel from its present width of 250 feet to 1,200 feet, and increasing the water frontage nearly seven times.

MARTINEZ, CAL.—Articles of incorporation for the West Coast Dredging Company, a concern organized by five Antioch men, were filed with County Clerk J. H. Wells here. The firm is incorporated for 50 years with a capital stock of $50,000, divided into 500 shares. It is organized for work on deepening waterways, excavation operations, and buying and selling of dredging material.

PORTERVILLE, CAL.—Geo. B. Sturgeon, who has been retained as the chief engineer for the storage water and distribution system for the Success Valley, arrived here from San Francisco and will put a party in the field. Mr. Sturgeon estimates the engineering work and preparation of plans will occupy about 90 days. Construction of the dam will be the largest single item of the work. This dam will be about 400 feet wide on top, 200 feet long on the bottom and forty-five feet in height.

SALINAS, CAL.—As the result of the drive for funds to purchase a site and construct a building for the proposed dehydrating plant to be installed here by Messrs. Lewis and King of Atascadero, a new company, to be called the Salinas Valley Improvement Company, has been formed here. It is composed of local capitalists and farmers. The concern has a capital stock of $50,000, of which amount $30,000 has been actually subscribed.

SACRAMENTO, CAL.—The Woodward Way Manufacturing Company proposes to sell 510 shares to certain persons in exchange for 11 applications for letters patent, and 490 shares to secure funds for the construction of a new building and to acquire tools, machinery, materials, merchandise and working capital. The company proposes to own, operate and conduct a general repair shop and sheet metal and electrical construction work, and principally to manufacture and sell certain automobile devices for which applications for letters patent are pending in the United States Patent Office.

COLUSA, CAL.—To obtain funds with which to increase its water and power supply the Snow Mountain Water and Power Company has applied to the Railroad Commission for authority to issue 15,000 shares of its preferred capital stock. The proceeds of the stock sale are to be used principally to construct a dam at a point in Lake county known as the Gravelly Dam Site. According to the application of the company other changes in the system have been planned with the general result that the power available will almost be trebled. It is estimated that the cost of the dam and improvements will not exceed $1,500,000.

OAKDALE, CAL.—That Melones appears to be an ideal dam site for irrigation purposes is the opinion of State Engineer W. F. McClure, who has just completed a preliminary inspection of the site where the Oakdale irrigation district is planning to build a reservoir. The State Engineer told local land owners who objected that a dam at that point would be more expensive than to work through the cooperation of the power companies; that the State Bond Commission would give preference to the views of directors, as representing the people. The two power companies have expressed a willingness to cooperate with the irrigation districts and either build the dams and sell water for irrigation, or to permit the districts to build and buy water from them for power purposes.

OAKLAND, CAL.—Several hundred thousand dollars are to be spent by the directorate of the San Francisco-Sacramento Railway, formerly the Oakland, Antioch and Eastern Railway, for improvements during the coming year, according to the expenditure budget just adopted. The work contemplates the construction of a branch line between Slyde and the plant of the Pacific Coast Shipbuilding Company, the purchase of additional motor equipment and rolling stock, and extensive improvements on the roadbed, maintenance and general equipment. In addition to six new passenger coaches to handle intercity traffic, new transforming substations will be installed, catenary construction employed on trolley overhead between Saranap Junction and Bay Point; the tunnel between Shepherd and Redwood Canyons constructed at a cost of $150,000, and the entire roadbed reballasted at a cost of $10,000. Work has already started on the Clyde extension.

THE PACIFIC SOUTHWEST

LONG BEACH, CAL.—Electrification of the Southern Pacific line on Broadway between Elm and Cerritos avenues and discontinuance of the remainder of the Broadway line is under consideration.

LOS ANGELES, CAL.—Application has been made to the State Water Commission by the Sespe Light & Power Company of Los Angeles for permission to appropriate 60,000 acre feet per annum from Piru Creek in Ventura county, for power purposes.

LOS ANGELES, CAL.—Bids on additional $500,000 of Los Angeles Flood Control Bonds were received February 11. This sale will bring the total amount issued up to $3,326,625. The total amount authorized is $4,450,000. The bonds will pay 5% interest.

CALEXICO, CAL.—Preparations are under way for meeting the drainage problem in the Imperial Valley. The Imperial irrigation district in conjunction with the mutual water companies and local drainage districts, will be formed and the condition remedied.

RIVERSIDE, CAL.—The Southern Sierras Power Company has made application to the State Water Commission for 45 cubic feet of water per section from Convict Creek, Mono county, for power purposes. The total amount of power to be developed is estimated at 14,077 T.H.P.

SAN PEDRO, CAL.—The Pacific Electric Railway Company has applied to the Railroad Commission for authority to abandon a sand-pit spur crossing Gaffey street on the Gardena-San Pedro line. It is proposed to re-locate the track to meet the requirements of a project opening up a main boulevard into San Pedro immediately west of the San Pedro line.

LOS ANGELES, CAL.—The city engineer, city attorney and city electrician have been instructed by the city council to prepare and present an ordinance providing for the installation and maintenance of an ornamental lighting system in Seventh street, San Pedro, between Beacon street and Pacific avenue. The city will pay a portion of the maintenance costs.

FORT SUMNER, ARIZ.—The new dam and canal irrigating about $8,000 acres of fruit and land on the Pecos river at Fort Sumner, can be completed for less than $200,000, as reported by M. C. Hinderlider, an irrigation engineer of Denver. $100,000 must be spent on construction of a new concrete dam, and the balance on an intake tunnel which will be built connecting the dam with the present gravity canal, which will be widened and deepened.

LOS ANGELES, CAL.—An application for authority to issue 50,000 shares of its common capital stock has been filed with the Railroad Commission by the Southern California Edison Company. The proceeds of the sale are to be used in making extensions and improvements to the company's system, subject to the approval of the Railroad Commission. According to the company's application the value of its operative property, as of December 31, 1919, is $85,279,573.56.

THE INTER-MOUNTAIN DISTRICT

LIBBY, MONT.—The Libby Water & Light Company will improve its plant and erect a dam.

HINGHAM, MONT.—This city has voted $50,000 for a municipal water system and electric light plant.

FIRTH, IDA.—This community is endeavoring to secure electric service from the Utah Power & Light Company.

RYEGATE, MONT.—The Montana Power Company of Butte contemplates extension of its lines to this city for light and power.

BOISE, IDA.—The Idaho Power Company has asked the Idaho Public Utilities Commission for permission to increase its rates for irrigation pumping service.

SALT LAKE CITY, UTAH.—The Utah Power & Traction Company has asked the Public Utilities Commission for permission to increase its fares from 6c to 7c.

HELENA, MONT.—Among the big irrigation projects now proposed in Montana is one planned to reclaim 150,000 acres of land in Hill and Chouteau counties.

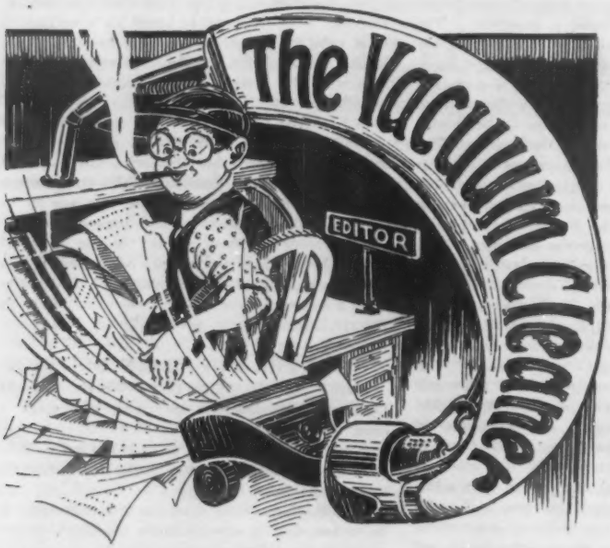
SALT LAKE CITY, UTAH.—Electrical interests of this city are seriously considering the formation of a cooperative association for the handling of general problems and building up the popularity of electricity in the intermountain territory.

HELENA, MONT.—A hydroelectric power plant near Rimini, to generate power for operating a street lighting system of this city, is being considered by the city council. With wood pipe, the project will cost $150,000; with concrete pipe, $175,000, and with steel pipe, $225,000.

BRIGHAM CITY, UTAH.—City officials are negotiating with the Utah Power & Light Company to ascertain on what basis current can be purchased for resale in this town. The city at present is unable to take care of demands for power on account of the limited capacity of its municipal plant.

ARCO, IDA.—The controversy between the Mackay Light & Power Company and the Ashton-St. Anthony Power Company, as to which company has the right to serve the village of Arco, has been finally settled by the Public Utilities Commission, which has ruled that the Ashton-St. Anthony Company have a prior right. It is the intention of the village of Arco to build a transmission line over a distance of several miles to tie in with the Ashton-St. Anthony Company's system.

AMERICAN FORK, UTAH.—Jed J. Mercer of this city plans to develop 1,000 hp. of electrical energy by a plant in American Fork canyon, according to a filing recently made with the state engineer. The application calls for construction of a dam from 25 to 30 feet high to store 500 acre feet of water, to be used as a supplementary supply during the low water seasons in the creek. To develop the power it is planned to take 20 second feet of water through a pipe line 30 inches in diameter and two miles long and use it under a 300-ft. head over two 3-foot wheels.



Golf gets into the blood in a most alarming way, according to a company which reports that its construction department, out on an electric extension, gets mixed in the names of tools and is discovered digging post holes with brassies and believing that the line can be built in less than 80. The complaint goes on pathetically:

"The bookkeepers keep track of how many strokes it takes to make out a bill and our general timekeeper figures on how many holes the employes have made instead of days work, while one of the contract department is figuring how many horsepower it will take to go around 18 holes on a 3-phase handicap and furnish 400 g. p. m. for raising alfalfa on the greens."

* * *

Brevity being the soul of wit, we think the following message from a section foreman to the roadmaster should go on record:

"No 6 did not whistle. Please send me another hand car."

* * *

"Dolly" Youdall, a prominent San Joaquin Valley contractor, noted for his amiable disposition, will possibly be recognized by many of his friends, who have met him in this frame of mind when trying to sell him something he didn't want to buy. This is his buying attitude.

* * *

Is it unlucky to see the new moon for the first time through glass? to spill salt? to meet a black cat? Nobody seems to be very clear about it, but some wise soul has listed the following bad luck signs which you can prove for yourself:

A crack in your chimney is a sure sign that you are going to move.

If you dream of smelling smoke, it is a sign you are asleep and had better wake up.

To see a man hanging paper over a flue hole indicates an impending loss.

It is worse luck to look in a dark closet with a match than to see the new moon over your left shoulder.

If you can see your shadow from an oil lamp while filling a gasoline stove it indicates a crowd of people are coming to your house.

If you smell gas or gasoline and look for it with a light, it foretells that you are about to start on a long journey.

Even if your house and furniture are covered by insurance, it is extremely bad luck to have them burn on Friday the thirteenth.

* * *

LITTLE BOY BLUE UP-TO-DATE

O little Ben Zene, come blow your horn!
You plow my meadow and hoe my corn.
Till the hired men that I used to keep
Look over the fence at my tractor and weep.

* * *

"FIFTY TO THE BUTCHER- SIXTY TO THE GROCER- WHEW! YOU FELLOWS SURE ARE AFTER THE ALTITUDE RECORD-BUT, IT'S ALRIGHT, IF YOU SAY SO- NEXT!"
LIGHT BILL, EH! WELL, I NEVER GO OVER THE MINIMUM OF A DOLLAR & A QUARTER-DO I-EH!"
"BUT, SIR- THERE IS A SURCHARGE OF THREE CENTS THIS MONTH, MAKING YOUR BILL $1.25"
-ROBBER!-

ONE MUST DRAW THE LINE SOMEWHERE

This picture reminds us of a touching notice which was seen hanging in the main office of a certain well known company:

"Our business has been established ever since 1858. We have been pleasing and displeasing people ever since. We have made money and lost money. We have been cussed and discussed, knocked about, talked about, lied about, held up, robbed, etc., to the end of the chapter. The only reason why we are staying in business is to see what the —— will happen next."